

# • COMPUTERWORLD

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## 'Mystery Hole' Strikes Again in Detroit Vote

By Thomas J. Morton  
Cox Mutual Bureau

**Detroit** — With the recent history of the punched card primary still fresh in the minds of politicians and concerned citizens across the Detroit area, another computerized election and again the final count appeared hopelessly delayed.

Again a "mystery hole" is bothering both the politician and the programmer and the charges and the countercharges are flying. And Detroiters are wondering what their city is trying to do to them.

Hinging on the outcome was a hotly contested gubernatorial race.

But this time, according to most opinions, certification of the vote seems highly improbable.

By midnight of election day, four hours after the polls had closed, only four of Detroit's 1,111 precincts had been tabulated. By 3 p.m. of the next day, only 200 precincts had been counted. Finally, after Detroit had the final tabulation of votes completed,

in the primary, unexplained punches in test decks produced an overcount of exactly 1,111 extra votes, one for each precinct. The official explanation was that a card reader had punched an extra hole in one card in a test deck and the final results were five out of six

test decks in error (CW, Sept. 16).

This time the "mystery hole" is a punch in the vote cards themselves at about M20 position in the ballot configuration.

In initial observation Los Angeles County seemed to have solved its previous vote count problems, but Flint, Mich., had a tough time with the weather. Stories on Page 4.

The card-to-tape program is designed to read a card with no holes and then spool out a demonstration punched cards have a hole there and the program is geared to extract any demonstration cards inadvertently added to the ballots.

According to reports, legitimate ballots in the punch at configuration were being rejected. The rejection necessitated reproducing the card without reproducing the punch (approximately at column 3, row 9) and running the card again.

"It seemed," said an accuracy board member at one of the three counting centers, "that every other card had the rejection punch."

City Park George Edwards is claiming that the voters sabotaged the election by manually removing the chads from their ballots after removing them from the Votomatic machines. (Continued on Page 4)



The XDS Sigma 9 uses a Teletype 35 KSR-based 7012 to communicate with the operator of the system. A 7017, based on the 35 ASR, is used to monitor the time-sharing software. In the background is the system's CPU; and to the left are two 7441 1,100 line/min printers.

## XDS Sigma 9 Handles Varied I/O Job Mix

By Frank Pista  
CW Staff Writer

**LOS ANGELES**, Calif. — The new Sigma 9, the largest system yet from XDS, is designed for both on-line commercial and scientific applications.

The Sigma 9 continues the trend toward commercial user appeal XDS initiated in the Sigma 6.

With up to 2-million bytes of memory on-line and a cycle time of 900 nsec/4-byte word, the new system will be competitive with the IBM 370/155 series. The system is intended to compete with other systems to controller.

Based on internal speed and system configuration, the XDS machine could be up to two and one-half times as fast as the 155 in performing jobs in a stream of scientific problems.

### Computer Mic

As the percentage of commercial work in a job mix gets larger, the advantage held by the Sigma would deteriorate until a totally commercial mix is considered. In this situation, the Sigma's performance would be somewhat less than that of the 155.

Offsetting this would be the flexibility in the 9's configuration. Up to 16 parallel processors, up to four, and independent I/O processors would make possible a degree of simultaneity that

would be very difficult to achieve in the 370/155, certainly throughout.

The Sigma 9 is organized around a high-speed CPU and as many as 11 I/O processors (IOPs) controlling I/O devices. Up to 12 access ports to memory can handle either multiple IOPs or CPUs, depending on the needs of the user. (Continued on Page 2)

## Study Reveals Underuse How Efficient Are DP Centers?

By Michael Merritt  
CW Staff Writer

**NEW YORK** — During scheduled running hours, the average corporate DP center spends about 30% of its time on repairs, maintenance, and idle Web-managed centers, however, spend only 19% of their time on these non-productive activities.

This is one of the conclusions reached by a recent study of 155 corporate DP centers using 155 computers conducted by A.T. Kearney & Co., management consultants.

Principal partner of the company, Walter J. Schroeder, told CW additionally that if the total round-the-clock available time was considered, the comparison between well-run DP centers and the average is even more dramatic, the 22 best companies in the survey were operating practically 68% of the time, while the average was only 40%.

The best companies spent 10% of their sched-

uled hours in idle mode, 6% on repairs, and 5% on maintenance. The average was 20% idle, 5% repair, and 5% maintenance.

Surprisingly enough, the largest centers had the poorest record, "Schroeder said. "This is because of poor scheduling problems; the larger centers are harder to manage, because they have more structured, inflexible organizations."

The solution to the problem, Schroeder said, is new methods and management.

Schroeder said that his firm's study has shown that the rosy dreams of effective use of computers have not come true. He cited three promises of the sixties that have not materialized:

- A reduction of middle-management personnel required by corporations as the computer began taking over routine decision making functions.
- Improved profitability and return on investment as a result of EDP functions fulfilling their

(Continued on Page 8)

"local" participation.

### Exhibition Dropouts

The mood of the exhibitors is not so positive. About 10% have cancelled their participation plans, citing economic measures as prime reasons.

"People could not expect to make enough sales to justify the expenditures for the exhibit, since, the exhibitors, were predicting decreased attendance.

Last figures from AFIPS held the show, which would use 840 rooms. This is down from an "oversold" position of 1,000-plus booths last summer, with over 300 "confirmed" exhibitors plus a growing waiting list.

Among recent dropouts were Unisys ("reorientation of marketing objectives") and University Computing Co.

Attendance projections and exhibitor numbers are exceeded only by the past two conferences, the Atlantic City last spring, and Las Vegas last fall.

In noting the precedent-setting

(Continued on Page 4)

### On the Inside

Programmer Licensing Suggested to Commission

— Page 6

### High Growth In Services Sector Seen in 5 Years

— Page 6

Communications	...19
Computer Industry	...67
Editorials	...10
Financial	...62
Societies	...35
Software/Services	...13
Systems/Peripherals	...15



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## For Weave Design

# IBM Employee Receives Software Patent

By Edward J. Bride  
CW Staff Writer

WHITE PLAINS, N.Y. — The first IBM employee to receive a software patent is Mrs. Janice Louise, who programmed a computer to interface with a fabric loom and a video display terminal.

The results of the program are user-designed textile patterns, woven at real-time at the command of an operator with a light pen.

Mrs. Louise is a Senior Institute staff member at IBM. She first applied for the patent three years ago, but it was only recently issued.

The "invention," based on the patented program, was first shown in the IBM display at the 1968 HemisFair in San Antonio. Visitors to that exhibit were given woven fabric patterns they had designed on a video display unit.

### Hard Copy Pattern'

Under the program, the operator draws an intended design on an IBM 2250 graphics terminal. The computer translates the design into instructions for the loom, and a "hard copy" pattern is woven.

The designer/operator can make changes without withdrawing the entire design, thus saving time in both the drawing and weaving stages.

Mrs. Louise's technique replaces the time-consuming method of keypunching cards, using a hand-drawn pattern from graph-paper as a guide and the punched cards to instruct the loom.

IBM spokesmen said the company did not consider the award a true "software patent," since the design program is not a product; it is not being marketed.

The difference, one spokesman explained, is in the definition of "software," since IBM considers only "program products" and "system control programs" as being eligible for software patents.

### A Patent is a Patent

The award, then, is for a "significant concept," according to IBM, and entitled "Graphical Design of Textiles," according to the Patent Office.

In legal jargon, the patent describes the invention as a "method of operating a data

processing system having a data manifesting means for graphically developing a textile weave design" from the outline on the display.

A specially designed loom, and

substitute recently acquired a 360/30 to perform administrative work, with the long-range goal of also using the Model 30 as a controller for the loom.

The "improved" form of the

the Fashion Institute, IBM noted. Sidney Buchman, coordinator of data processing at the Fashion Institute of Technology, said it was felt that the software under patent might be used for knitting, as well as weaving.

He said it takes only a little "imagination" to envision a sheep entering one end of an assembly line, and a knitted garment leaving the opposite end. But, Buchman said the inventor could be "put to good use" on an experimental and developmental basis.

The Fashion Institute has over 1,900 full-time students, all being trained for entry in the fashion industry.

Buchman didn't know, and IBM refused to speculate, on its possible entry into the fashion world. An IBM spokesman would only say that the Louise invention was "not now a product," but he would not, as is company policy, elaborate on any plans.

Mrs. Janice Louise and IBM patent attorney Charles P. Boberg discuss a portion of the patent description.

An improved version of the program, were both presented to the Fashion Institute of Technology in New York. The in-

designing program is covered by another of Mrs. Louise's patent applications, and is being tested for "educational purposes."

## Sigma 9 Continues XDS Commercial Trend

(Continued from Page 1)

(Continued from Page 1)

CPU, IOPs and memory each have individual locking permitting synchronous operation. Four-way interleaving in memory also results in higher effective memory speeds.

Two models of IOPs are available. The Dual-Channel Multiplex IOP handles up to 32 peripheral devices at channel rates up to 900,000 bytes/sec in the multiplexing mode. The Rapid Access Disk (RAD) IOP is used with RAD storage units only. Data transfer rates up to 3 million byte/sec can be handled.

Two levels of interrupt can be provided, with hardware determination of interrupt priority. Two blocks of 16 general-purpose registers are standard. These are optionally expandable to a maximum of 64 in increments of 16.

In addition to the decimal arithmetic capability required for commercial applications, the Sigma 9 provides fixed and floating-point.

Word and double-word precision are available in fixed and floating-point, halfword or fixed only.

Two real-time clocks are standard, with an extra two options: core memory, and slave and master memory protect modes are available.

The basic architecture of the Sigma 9 computers was the foundation for the Sigma 9. This enables user programs now running on the Sigma 9, 7 and 5 systems to run without alteration on the new system, and 7 systems.

Sigma 9 will use all the peripheral equipment now in use with the other Sigma systems.

In addition, a new commercial line printer, the Model 7446, announced with the Sigma 9, will be available for use with the other Sigma systems. Scheduled for delivery in the third quarter of 1971, the device can print up to 132 characters at speeds as high as 1000 lines/min.

A typical Sigma 9 system, with 128K words of main memory and including a variety of peripheral equipment, will have a base price of \$1,760,000. The one-year lease price will be \$41,000/mo.

Model Features	XDS Sigma 9	RCA 7	Burrus 85700	IBM 370/155	NCR Century 300
CPU	20.5 to 39.7	14.4 to 36.8	10.0 to 12 (2 CPU's)	10.4 to 18.4	21.5 to 45.2
Memory	512 to 2,048	256 to 2,048	128 to 256	112 to 512	128 to 2,048
Cycle Time/ Access Time (nsec)	225	190	625	135	60
Max. Processors	4	6	2	5	2
Interfacing	4-way	None	None	None	4-way

Chart compares XDS Sigma 9 with other recently introduced systems.

## Xerox OS Suited for Local, Remote Batch Jobs

By Donald Leavitt  
CW Staff Writer

EL SEGUNDO, Calif. — The development of a business-oriented operating system for use on the XDS Sigma 9, and on the XDS 5 and 7, emphasizes the company's new direction in a business user's processing environment.

The Xerox Operating System (XOS) is a transaction-oriented system designed specifically for local and remote batch business sharing applications, areas previously stressed by XDS, can be handled concurrently with batch

jobs, but in a background mode, under XOS.

To support the commercial user, the system includes an XDS Cobol compiler which conforms to ANSI standards, a Meta-Symbol assembler, and a Data Management System. Extended XDS Fortran IV and Fortran Load and Go (Flag) compilers are also available along with a Basic compiler.

XDS said that XOS provides both complete multiprogramming and multiprocessing capability.

To handle multiprogramming,

XOS uses the interrupt structure and internal task scheduling, and the system's memory map to allow programs to be stored without regard to contiguous core space. XOS uses dynamic resource allocation techniques to maximize the number of currently active jobs, the company said.

In supporting concurrent multiprocessing, the system treats remote batch jobs in the same manner as it does local jobs. Spokesmen said that as many as 48 time-sharing users will be accommodated by XOS. XOS provides for sequential,

indexed sequential direct-access and/or partitioned file formats on magnetic tape, rapid access fixed-head disk, and removable disk storage, XDS said.

Included in XOS, DSD said, is a generalized Telecommunications Access Method (TACM) that enables the user to process his applications programs on the telecommunications network.

The Xerox Operating System is expected to be delivered in the third quarter of 1971, the company said, but time-sharing until the first quarter of 1972.

# Manufacturer Safeguards For Data Called Inadequate

CW Midwest Bureau

CHICAGO - High interest in security was shown at the well-attended Computer Management Association seminar on catastrophe prevention management, some of the experts and most of the attendees felt that not enough was being done at the computer manufacturing level to safeguard data in the on-line system.

In one pointed out in one of the seminar's question and answer periods that computers were being made larger and larger, faster and faster, a fact which, for economical operations, almost necessitated multisource use; but that next to nothing was being offered in hardware or software to provide security for data transmission.

"Not only can data be stolen by wire-tap," said Louis Scorna Jr., president of Data Processing Security, Inc. and a cochairman of the seminar, "but even data that is coded and unintelligible to the wiretapper can be sabotaged by wiretapping."

He explained that data can be modified during transmission if the wiretapper knows his business.

Scorna placed the responsibility for on-line security with the corporate user and with the equipment manufacturer. "Not enough," he said, "is being done, it was the responsibility of the user to insist on built-in safeguards in hardware and in software."

"A scrambler is not and should not be the answer," he said.

Another speaker told of a government project in which the equipment was being developed. Both the equipment and the software are being designed so that the designers are daring both government supervisors and manufacturing representation to attempt to extract data in any conceivable manner from an on-line transmission and obtain usable information.

The results of the research are expected by the end of next month.

A.E. Frei, director of Sonic 360 Reservations Systems for Continental Airlines, described, in a presentation of Continental's system, a method of security for data in the on-line environment.

Frei said the airline terminal has a unique address which serves as the primary source of data control. The agent's assembly area, a specific data record assigned to each set internally, provides, Frei said, the key link for all data transmission to and from a terminal and is the principal source of system security.

#### Unique Number

Each agent, Frei explained, is assigned a unique number. Each city on the airline's system has an internal data record containing a list of all the agents in that city and the duty codes each agent can perform.

Each agent comes on duty and must sign in by entering his ID number, his duty code, and his initials. If a match is made, the agent receives an "OK" and the agent is free to operate the system within

**California Signs With Ticketron**

SACRAMENTO, Calif. — The California State Parks and Recreation Department has signed with Ticketron, Inc., a New York-based ticket reservation service, to handle computer reservations for state parks.

The department had signed with Compusicket and had the plan in operation when the company folded in April and it was forced to go back to manual methods.

his limits of responsibility.

The agent's sign-in is stored, and all transactions conducted by that agent are checked against his sign-in.

Company rules state that the agent must sign out if leaving his set, which would prevent him, or anyone else, from using his codes and numbers until another sign-in was made.

He worked with both the attendees and the experts seemed to uncover a mutual dissatisfaction with the security system.

While Continental's security system would prevent certain fraud attempts, it would not, it was felt, prevent data theft by line tapping, or perhaps worse. Frei had pointed out that the value of the data would have to determine the cost determination of the security.

## Youth Indicted in Data File Copying

Louisville, Ky. — A Cincinnati youth was indicted by the Grand Jury here on charges of transmission of "stolen properties interstate by wire, radio, or television" for alleged unauthorized access on a time-sharing network.

Steven M. Coffman, 18, was arrested in July by agents of the Federal Bureau of Investigation (FBI) and the FBI acting on complaint filed by Smith Castle Bell Telephone in behalf of its Louisville customer, Metridata Computing, Inc., a T/S firm.

According to the FBI, Coffman allegedly seized a long line leased to Metridata and then, using Metridata code numbers and passwords, extracted data from the records of Metridata's list of the firm's customers using a telephone and a teletypewriter in his employer's offices.

Coffman was arrested after FBI surveillance and after several telephone long-line traces linked the "unauthorized" use of Metridata's computer system to a firm at which he was employed.

FBI agents said that Coffman was very close to completely bypassing Metridata's security programs when he was apprehended.

Coffman was arraigned in Louisville in the U.S. District Court for the Western District of Kentucky, at which time he entered a plea of not guilty.

The defendant requested, and received, a change of venue from Louisville to Cincinnati.

A spokesman for the U.S. Attorney's office in Louisville said that the government plans to contest the change of venue.

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# L.A. Vote Count Succeeds, Loose Chads Still Problem

By Phyllis Higgins

For West Coast Bureau

**LOS ANGELES** — An extraordinary effort was put forth by Los Angeles County, representing one-third of the vote of California, more than 7,000 precincts and the largest vote group in the country, to have a smooth-running computerized election.

Controversy and trouble had plagued its Votomatic punched card vote system ever since its first use two and one-half years ago.

But hard work, extreme care and intense scrutiny to detail paid off — the election count ran as smooth as silk.

Bone-wear election officials, hired consultants and political observers heaved with relief.

But what was the cost of this accomplishment? No cost savings, although that is its most loudly touted virtue. Official figures for the cost of the election are not in, but they range from estimates of \$3.5 million to \$5.1 million. Ray Lee, registrar of voters, says the election cost \$3.5 million or \$1 per voter, but outside experts vehemently dispute his estimate.

Before costs are broken down in several departments, it will be

a month or more.

Speed is the vote count is another touted virtue. Election experts say that under the old manual methods they had snap tallies by 10 p.m. and rarely was an election board on the scene after 2 a.m. on election night. Now they have several snap tallies available to the press and people in the neighborhood.

The California polls close at 8 p.m. and even with helicopters and speeding sheriff cars used for this election it took at least an hour to get them to the counting center.

Then the voter had to be processed and the count got off to a slow start about 10 p.m. And

that was just a few precincts, not a representative sampling of all of them.

To get around this annoying problem at this time, the TV networks pooled their money and got approval to have key precincts hand counted at the polls so that they could have early returns for their computerized predictions.

As far as the new methods known as "loose chads" particular precincts voted, they had to wait until the computers printed out totals by precinct — anywhere from 36 hours or more after the election. This is important to political workers who want to know if their effort turned the tide.

The last tapes were put on the computers at 7 a.m. and experts said this is no improvement over earlier methods.

With all the smoothness and checks and double checks there is still controversy about the vote count. It is believed that all possibilities for fraud have been checked against here, but the unpunched vote cards are still a crucial problem.

In each case where there is a dent or partially punched out chad, election people will decide whether the voter intended to punch it. In some cases all the way at rough cards can cause jamming of the card readers. The reaction would seem to conclude that the voter meant to vote, and punch out the chad.

But Les Rivers, chairman of

the Democratic Campaign Committee summed up this process: "Any time a judgment factor gets involved in the vote, it's a bad system."

Although the problem of loose chads is solved as possible before the cards reach the machines, cards jam at an appalling rate. Ten cards in one card reader jammed in the first 10 minutes of the day.

While this represents a watchable rate, the actual rate was similar. This helps slow the card readers from an advertised rate of 500 card/min to about 150 card/min. Cards that jam are put aside and duplicated after the regular count has been processed.

## 'Mystery Hole' Reappears in Detroit Vote

(Continued from Page 1)

Edwards is implying, according to some sources, that the manual removal of the chad, causing the "mystery hole," is a deliberate act designed to squelch once and for all, computerized voting in the city.

Who spread the information that such a specific hole would reject the card hasn't been made clear. The program was to be kept secret by the city until after the election when both parties could then have it checked.

Others feel that the punch was made by the voters by accident, that the instructions for voting for or against a proposition on returning the troops from Vietnam were so confusing that the voters made the punch in the wrong spot.

A small faction believes that the ballot card did not properly fit into the Votomatic punch device causing the vote cast by the voter to punch out a chad in the wrong space. If that were the case, this faction believes, then possibly the whole vote is in error.

Persons holding this view feel that their suspicion could be easily verified. M20, they feel, could really be a misprint of "no" vote for proposition E. The misplaced place would cause the card to be rejected, and thereby eliminated.

A parallel misplaced vote at M5

would not be rejected by the program, however, and the card would be processed and counted, for that proposition completely ignored in the count as if the voter had skipped that proposition.

Later, with the count not even begun in two of the centers, Edwards was quoted as saying that the challenges of the accuracy boards were interfering with the counting process.

In addition, the "borrowed"

### A Rainy Day in Flint

CW Midwest Bureau

**FLINT, Mich.** — Even though county clerk George G. Dunn and Computerized Election Systems Inc. (CES) profited by the experience of their successful punched card August primary, there wasn't much they could do about the weather for this general election.

Heavy and persistent rain threw a wet blanket on the election, dousing voters' hopes for a final tabulation of 100,000-plus votes.

Punched cards not actually doused by dripping wet voters remained in the dampness and delayed the count. The final tabulation wasn't reached, according to a spokesman at the DP counting center of the intermediate school office, until after 11 a.m., 10 hours later than Dunn's expectation.

At first, according to Dunn, card readers were adjusted to take the "wetter" punched cards. When that didn't work, forced drying was tried. One source claimed they laid some of the cards in the school's cafeteria ovens — 15 minutes at 350°. Forced drying, the spokesman said, however, just buckled the cards causing another problem, reader jamming.

Natural drying and duplication, where required, finally got the count process running.

The first reports on the delays in getting the final count were explained by Edwards: "It took more time than I had anticipated getting absentee ballots counted at the polls."

computer centers were taken away from their election chores as the press of daily business meant the lenders — two banks and a gas company — had to use their own computers for their own work.

## Afips Hoping for 20,000 Fall Conference Attendees

(Continued from Page 1)

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This year's keynote will be delivered by H. Ross Perot, the philanthropist/patriot/businessman of Electronic Data Systems, who is scheduled to discuss the theme of this year's FJCC, "Systems and Society."

Many of the exhibitors will be showing OEM products, including Control Data Corp., which cancelled its exhibit last spring but was unable to recover its deposit. The fee was reportedly applied the fall ball, however.

IBM will show two of its newest computers for the first time to the public (except for "previews").

The new System 7/ process control computer will be simulating a test of electronic components in a stand-alone mode, a company spokesman reported.

The 370/155, among other tasks, will be performing six user jobs in a "typical job mix," the

company stated, using five languages (PL/I, Cobol, Fortran, Algol, and Assembler) under OS/MVT and teleprocessing under CPM/BSC.

Alips has been able to exceed its goal of allocating 10% of the space to "new faces." At last count, over 30% of the exhibitors would be showing for the first time, or returning after an extended absence.

In addition to the exhibits, there will be 26 technical sessions, nine of which will include panel discussions. There will also be a six-session composite, entitled "Broad Perspective," during which industry experts will informally address the following topics: personal computing; pitiful data base management; LSI; multiprocessing; state-of-the-art; and performance analysis.

These sessions will not be re-

produced in the conference proceedings. The program begins with a "kick-off" at 12:30 Wednesdays and continues with "Data Base Management" at 2:30, then resumes with the other four topics on Thursday.

The long-range weather forecast calls for temperatures "below the normal range" of 51°-72°, with some precipitation likely. A spokesman for the National Weather Service advised that a "dual purpose" rainfall, which could also be used as a topcoat, would be suitable for outer wear.

Alips figures indicated over 10,000 people had reserved over 6,200 rooms, and the numbers are expected to grow significantly as opening day nears. With over 2,000 preregistrants, however, the aim of reducing last-minute lines was probably lost.

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## Privacy Commission Chairman Suggests Licensing Plan

CW Midwest Bureau

**CHICAGO** — Witnesses appeared before the 15-member Illinois Data Information Systems Commission here recently to assist the commissioners in a study of ways to counteract unrestricted computer analysis that could violate the privacy rights of the citizen.

Allocating responsibility to safeguard privacy squarely on the shoulders of programmers and analysts, Sen. John Langman (R-Chicago), chairman of the commission, said that one of the results of this study could be a proposal to license analysts and programmers.

"A check could be provided by establishing a code of ethics which, if breached, could be

grounds for taking the license away."

"Licensing," he said, "could also be helpful in passing on a person's qualifications for a computer job."

Harry L. Swatt, director of planning for Honeywell, testified that users have not asked for built-in safeguards.

"Manufacturers," he told the commission, "are more concerned about privacy than are other individuals because it is the computer itself, and not who is using it, that gets the black eye."

"Manufacturers Concerned"

Swatt told the commission that licensing of computer personnel would be "a cop-out. . . . That's the lowest priority." It's."

One witness, an author of books on the subject, told the commission that computers pose potential threats for efficiency, but that "they also present the gravest threat of invasion of our innermost thoughts and actions."

The witness, Dr. Jerry M. Rosenberg, a New York psychotherapist, consultant, and author, said at a public meeting that giant computers are dispersing widely dispersed files on American individuals.

Rosenberg claimed that computer manufacturers have "shirked their responsibility" by not developing built-in safeguards against information leakage.

"The public has the right to

know," Rosenberg said, "who will have the power to control the computers, and most importantly, how confidentiality and individual privacy can and will be protected."

Norman J. Ream, described by the commission as a New York management seminar executive, stated to the commission that the establishment of large gov-

ernmental and intergovernmental data banks would not necessarily infringe on the citizen's rights of individual privacy but would rather promote greater governmental economy through efficiency.

Chairman Lanigan said that the commission will hold additional hearings before the General Assembly in March.

## Oklahoma Senate Awaits Study on DP Feasibility

CW Midwest Bureau

**OKLAHOMA CITY** — The University of Oklahoma is presently conducting a feasibility

study on whether the state legislature should use computers, according to the office of State Senator president pro tempore Fred G. Gee.

A portion of the legislative use would be, according to the senator's office, the taping of Oklahoma statutes. A contract was let to the Aspen Co. for the tapes, but the senator has been quoted as saying that the tapes were not usable for the legislature due to inaccuracies.

The senator has asked the state's attorney general for a determination as to whether or not the state should file a breach of contract suit against Aspen Company.

According to Rob Gee, Senate administrative assistant to Smith, there has been no decision from the attorney general.

While the final report on the feasibility study has not been received from the university, Gee feels that the report will indicate the advisability of computer use by the state legislature.

No comment was available from officials of the Aspen Co. regarding the possibility of suit.

## Stanford Keeps Track of Bugs

**PALO ALTO**, Calif. — Since the beginning of this month a computer has been keeping track of the germs at Stanford University's research hospital.

Information from laboratory tests is fed into the computer which determines whether the test sample is a bug or a track of which antibiotics are successful against different types of bugs, and helps doctors prescribe medication.

Laboratory tests have been known to be influenced by human error. Stanford researchers believe the computer system will provide better quality control and reliability. The results will be "improved diagnosis, timelier treatment, and far less medical paper work."

### Computers on the Scene

**CHICAGO**, Ill. — Computers have arrived on the scene to aid professors struggling to meet the publish or perish compulsion. An Illinois professor typed 2,155 lines of Shakespeare's sonnets through a computer which produced 24 pages of analysis.

Among the findings: Shakespeare used 3,211 different words in the sonnets; 13% of these are "monosyllabic"; function words such as "would" is used 400 times, and "is" is used 490 times, and 54.9% of all words are monosyllabic function words.

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## VIP Head Sees Switch To Services in Decade

By A CW Staff Writer

RICHMOND, Va.—The time is ripe for a complete reversal of trends away from hardware to services," according to John M. Van Horn, president of VIP Systems Corp.

"Computers have been oversold," Miss Van Horn told CW. "Companies are finally becoming result oriented. Management is no longer interested in new hardware for its own sake; they want to know what they can get out of it."

Contending that the future of data processing lies in effective computer power rather than just running software, Miss Van Horn noted, "In the future this may mean the use of computer services rather than an in-house computer, or a mix of the two."

The service bureau head also predicted the imminent blossoming of the information processing utility. "Other computer service options will be available—leasing, affiliate, or franchise—with these nationwide communications oriented services. And the impact on other segments of the computer industry will be profound."

Miss Van Horn estimated that hardware consumes 80% to 85% of DP budgets presently, while software accounts for 10% to 15%, and services 5%.

### Complete Reversal

"In the next 10 years we are going to see a complete reversal of this ranking," she went on. "Services are going to become the major segment of the industry, representing well over 50% of the purchasing dollar. Second will be software and third will be hardware."

"This shift will be caused by the shift to the external use of

computer power through the computer utility and away from internal, in-house computer systems."

Economics of scale constitute one of the main reasons for the turn to information processing utilities, Miss Van Horn noted. She said also that a utility may be able to provide faster turnaround time than the in-house DP center.

"In other words, the computer of a small company may be better able to get a special management report on demand from the information processing utility than from his own computer system, which is only scheduled for maximum cost effectiveness, but has no flexibility for special management demands."

### Marketplace Change

The structure of the DP marketplace will change, too. Miss Van Horn forecast, as mainframe manufacturers cease dealing with end-users and the utilities take up the role of data processing retailers.

Concurrent to this prediction, Miss Van Horn said that IBM's market dominance will disappear, and will become "one of perhaps five major computer vendors, each having between 15% and 30% of the market."

"We will see the information utility come from the scientific and word processing to on-line pictorial processing within the next decade," she said.

Concerning the threat of misuse of data banks, Miss Van Horn said: "I think that by the end of this decade we will see less and greater misuse of our fears and disasters, a great many of our hobgoblins concerning such notions as data banks, invasion of privacy, and Big Brother."

## Study of Centers Details Ineffective DP Utilization

(Continued from Page 1)

primary purpose of providing faster and better information," he said. Management's lack of their analytical training and understanding of the business through information systems becoming the general managers of their enterprises.

The study also showed that in the average center only 48% of available computer time is used productively, based on the computer's utilization only 64% of the available time and not round the clock.

In addition, 25% of the manned hours are wasted in the average center.

He said that 42% of the companies do not maintain accurate records of computer performance. This makes effective analysis of inefficiency most difficult.

Because of technical advantages, firms using multiprogramming achieve higher production.

Schroeder concluded that the "findings of this study suggest

that the EDP manager of the '70s must become a much more effective manager" of the resources with which he is entrusted.

"This study indicates the total burden of excess computing capacity in the U.S. is about \$3.5 billion. Elimination of idle time and reruns would increase throughput about 20% and reduce costs by about \$1.2 billion per year."

"Elimination of unmanned hours would provide a 75% increase in computer throughput. This is equivalent to about \$2.25 billion in computer rental per year."

"These projections do not even consider the improvements which can result through use of available technology in the equipment now installed. The wave of criticism, of both computers and those who work with them, seems to be in some ways justified."

"The status of the EDP manager is best characterized by one word—opportunity," he said.

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## Editorials

### Back to the Drawing Board

A computerized vote counting system should provide three things: reliability, economy, and speed.

Punch card voting, in at least three major cities, flunked out again last Tuesday.

Considering the importance of elections, and acknowledging the need for a faster system than paper ballots and a cheaper system than currently available voting machines, it seems to us that development of a really good computerized voting system should be undertaken at once.

Perhaps ideally the project should be funded by a foundation and undertaken by a university. The system could then be licensed to private companies which could charge lower prices because they would have no development costs to recover.

The current mess is doing neither the public nor the computer industry any good.



### Letters to the Editor

#### 'Solutions Looking for Problems'

Regarding the article [CW, Oct. 23] on library automation, [The U.S. Office of Education] USOE and Lankin are embarked on a fruitful but difficult mission analogous to, development of an SST.

One can design a Mach 2 aircraft on the drawing board. But getting it to fly successfully with a load requires advances in physical and chemical metallurgy, fabrication techniques, machine tooling, construction methods and transusions of impressive amounts of capital with a payout only dimly, if at all, evident financially; some would say sharply less evident sociologically.

Libraries, as repositories of knowledge, are beginning to find themselves hastening to meet them on their ground and within their economic framework as advances in COM, MIC, communications technology, micropublishing, audio-video techniques, terabit data bases coupled with increasingly cost-effective computational methods and processors come to their assistance.

Wouldn't it be nice if our country and its people generally were reaching the horizons of educational opportunity and utility was an exciting kind of Mach 2 "rip-off"?

Salesmen are "solutions looking for problems" and their concerted efforts assist materially in the cross fertilization and interdisciplinary methods which (who are we to say) areas of Lankin's bestowal are most in obtaining a cost-effective implementation.

Librarians are, by necessity, frugal with scarce resources. Their sister environment is excellent for the evolution of value-engineered systems and hardware.

Continuing exposure by CW in this area will assist in the gentle conversion of "library" types to "our" types—and even vice-versa . . .

Cedric Sheerer, Consultant

Los Altos, Calif.

#### University Did Not Sell Computer Time to Candidate

Your Sept. 30 issue carries an article entitled "Mass. Primary Sees Two Candidates Use Computers," which includes the statement that computer services used in the primary campaign of Robert F. Drinan were "... rented from MIT."

The statements are in error; computer services used in Father Drinan's campaign were not obtained from MIT. MIT's policies do not permit the sale or use of our computer facilities on behalf of candidates for public office.

Robert H. Scott, Director  
Information Processing Services  
MIT  
Cambridge, Mass.

Confusion apparently arose from a statement by candidate Drinan regarding the consultant company, a founder of which is also a lecturer at MIT. The computers contracted for the work were reportedly those of two local firms. Ed.

#### Comment on IBM Marketing

An article in a recent New York Times indicated that Thomas Watson, on his visit to the Soviet Union, found there was a difference in marketing approach between the IBM Corp.'s approach and that of the Soviet Union. It was not indicated what the difference might be.

It appears that the difference is that IBM believes in an IBM monopoly in the computer market within a country and the Soviet Union believes in a state monopoly and control of the computer market within its country.

The IBM way seems to work within the U.S.

Thomas E. Doyle  
Vice-President

George S. McLaughlin Assoc., Inc.  
Summit, N.J.

#### Response/360 Prices Corrected

Thank you for publishing your article on Response/360 Inform package [CW, Oct. 14].

The price you quoted for our Response/360 Inform is really for our Response I service. The correct Response/360 prices are \$9.95/hr. for connect time, 30 cent/sec for CPU time, and \$1.00/mi/3,440 characters of storage.

• Everett R. Daly  
Product Manager

Response  
Leasco Time-Sharing  
Washington, D.C.

#### How You Can Locate Salvage Company

A number of readers have inquired how they can locate a salvage company interested in buying their discarded punched cards and print-outs.

Since printing a national list of salvage companies is impractical, we suggest that persons interested in selling their waste paper look in the classified telephone directory under "Paper Stock - Waste" and under "Waste Paper."

Companies listed under these categories will either make arrangements to pick up waste paper or will be able to advise where such a service can be obtained locally. Ed.

## What's New in the Fed? This Firm Has the Data

WASHINGTON, D.C.—The Center for Political Research (CPR), a two-year-old firm, uses a computer to tell its clients what's going on in the Federal Government. "We're sort of bookkeepers of what's happening in the government," said President Anthony C. Stout.

CPR Research Services, one of two divisions within the company, has created the largest computer file in existence on incumbent congressman and their constituents, according to Stout. The data bank collects serves as the nucleus for several statistical routines. For example, a set of up to 100 different characteristics is maintained for each congressional district (CD) in each state. The correlations between predictor variables, are correlated with congressional roll call data through the application of statistical routines. The results are used to analyze congressional voting behavior.

In the 104th CD in Indiana, for instance, the computer has noted the following: the largest city in the district is Muncie, with 68,603 people; 38.5% of the population are white collar workers; 70.3% of the residents own their homes; and with a median value of \$9,930, the biggest industry is the manufacture of durable goods.

The computer also indicated in fiscal year 1968, the Department of Defense spent nearly \$60 million in the district; and during November 1968, 60.5% of the vote in the 1968 election. The voting record of the district's congressional representative is given by name, date and vote cast.

Normally, by analyzing pre-

vious votes of individual con-

gressmen, CPR is able to come

up with a prediction of how

these representatives will vote

on future legislation.

"Large corporations and others are interested in such information," Stout added.

CPR is also analyzing what

Stout called "deviant voting."

He explained: "The computer can give us clues, for example, to why certain people suddenly voted a certain way when his prior voting record shows a completely different pattern on similar bills."

"We have a listing of all corpora-

tions

and unions in a congress-

ional district," said Stout.

Computer firms in the television writer segment in CPR's Washington office. Software for the project was done by Mathematics of Princeton, N.J.

"All of our information was previously on System Development Corp.'s time sharing system in Washington," Stout related. "SDC lost a great deal of money on its operation and they closed down about April 1."

"We had to pull back, regra-

phram our project and find a place to go. We finally got a limited access to the University of California system in June 1. On June 15, we went on the air with National CNS."

The file contains approximately 10 million characters of data.

"Nobody," added Stout, "ever put Congress' votes in a computer and accessed them before."

Input to the system is from various sources, including CPR's nationwide state political data that the company maintains. Data comes from periodicals, newspapers in the states, plus the 70 CPR correspondents throughout the nation. Update varies and is currently about once every two months.

# The Question Arises: Who Will Control DP Problems?

The computer area has been hit by many failures in the past years. More than likely you may have brushed them off as being relatively unimportant, when contrasted with the great successes.

However, it is important that this perhaps necessary ability existing inside the industry to handle some of the failures is being quickly dissipated outside the industry.

## The Taylor Report

By Alan Taylor, CDP



as the computer applications widen, and touch more nearly the rest of the population.

In particular, the voting fiasco is stirring legislatures to action. One of the country's most active areas of political corruption (it did in the antipollution field when no one believed that cars would ever be controlled) is the California one, based in Sacramento.

Recently, the California Senate passed a resolution about this area which states quite clearly that it intends to do something. And where California is concerned, it is difficult with a state that is quite capable and competent to really take action in this matter.

Subsequent to the resolution being passed I received a letter from a local committee concerned. I would like to share this letter with you, without any further comment.

I think that this may be extremely important, and I would like to suggest that when you have time, if you contact Mr. Cathcart, or myself and let us know what you think.

The only action which has so far been taken, incidentally, is that a hearing on the licensing of computer programmers, and operators was called for January. Here then is the letter:

*[Senate Committee to consider Senate Resolution 240, relative to computer operations [and] chaired by Sen. Alfred H. Song.]*

*[As expected to be held in January.]*

All interested persons

who wish to testify are requested to notify the undersigned as soon as possible so that they may be included in the agenda.

A broad staff study preparatory to this hearing has revealed that computer programs and output can have massive effects. Both individuals and society at large may incur serious injury because of faulty programming, especially with little recourse, because our legal system is geared to non-computer technology.

Many computer programs involve extremely sensitive areas involving the privacy of individuals and the security of company records, with few legal sanctions

against unauthorized use of computer output now in existence. Little, if anything, is available today to insure responsibility on the programmers and software companies.

The quality of training schools ranges from poor to good, but it is difficult to determine objectively because there are no standards for testing the competency of the graduates.

The fact does not appear to be any recognized definition of a computer programmer.

A clear need exists for major modifications in criminal and tort law to accommodate computer technology, and in the area of regulatory law with which this committee is most concerned.

There it is equally clear need

for establishing standards and means of insuring that these are met by programmers, software companies, and training schools.

The committee will be exploring to what extent the state should be involved in the establishment of standards for the data processing industry. The committee naturally invites your comments relative to this hearing before the hearing date.

James A. Cathcart, Consultant  
Senate Committee on  
Business and Professions  
Room 2044  
State Capitol  
Sacramento, Calif. 95814

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## Song's Senate Resolution 240

Whereas, The electronic computer has become one of the most important tools in modern business and government; and

Whereas, Public confidence in the reliability of these electronic computers has been severely impaired by failures during the counting of ballots in several counties after the recent primary election; and

Whereas, Neither the electronic computer business nor the professional competence of its technicians is subject to any regulation whatsoever; and

Whereas, It is in the public interest that electronic computers be operated and maintained in such manner as will merit confidence in their accuracy; now, therefore, be it

Resolved, By the Senate of the State of California, That the Senate Committee on Rules is hereby requested to assign to an appropriate committee for study the subject of licensing and regulating the electronic computer industry and electronic computer technicians; and be it further,

Resolved, That such committee report its findings and recommendations to the Senate on the date specified by the Rules Committee upon assignment of this resolution.

## Letters to the Editor

### Reader Seeks Support For Post-Processor

Alan Taylor has highlighted some of the problems with the implementation of the Cobol language. The problems of Cobol should be kept in the spotlight and not brushed aside as "little inefficiencies." These little inefficiencies are "the seeds of disaster" when they are generated into the hundreds of subroutine that make up a single system.

In particular, I wish to address the IBM ANS Cobol compiler. We have studied some of the compiler output and are convinced of significant improvements can be made.

We have approached our IBM representatives about optimizing the output of the ANS Cobol compiler and they responded that an indication of general interest was necessary in order to determine IBM's intent, let me make our needs known!

As Alan Taylor points out, a new compiler would take too long. As an alternate proposal what about a compiler post-processor? A post-processor has several advantages over a new compiler:

- A post-processor would probably be available sooner than a revamped compiler. Modifying a compiler is typically a long complicated process.

- The compiler would not require much cover since the post-processor would be a separate job step. This would make optimization possible for

more users with smaller machines.

- We would not have to consider sacrificing any language specifications to achieve optimization and, therefore, the post-processor would be more generally usable.

The user would select optimization only when he felt it was the most advantageous.

Since optimization could be relatively expensive, the user might not find it desirable during the testing phase or for once-optimized code.

IBM Cobol users, please contact me at Aetna Life & Casualty, 151 Farmington Ave., Hartford, Conn. 06115, so that we can put a solution.

Judy Packer, Administrator, Language Research, CDP Support

Aetna Life & Casualty  
Hartford, Conn.

### Teach Programmers How to Write Programs

The Cobol efficiency series by Alan Taylor has resulted in some interesting replies from CW subscribers. I think the problem was neatly summarized in the first paragraph of your letter from my former associate and longtime friend and Fortran programmer, Newell Usher (CW, Sept. 2).

If Cobol is selected, we should be sure that our programmer can write an efficient Cobol program. Assigning an auditor to

redo a poorly written program will result in a "kludge."

In addition, I would recommend selecting the auditor from the defensive line of the Minnesota Vikings and assigning him a food taster.

If we are getting Cobol programs which require only the changing of a "few statements" to make them efficient, it's probably because most of us are not aware of what is and is not efficient. They need a course in Cobol statement efficiency.

This will include the machine language resulting from selected Cobol statements and combinations of statements. This is the basic point home even if the programmer can't read machine language.

Often the problem is more serious. Unless the program is well designed and built, one, including an auditor, can make it efficient, only a little more efficient. The solution is to teach programmers how to write programs. Don't confuse this with learning how to form Cobol statements.

Programmers should be taught how to design and build programs to suit a purpose. This is where much of the efficiency is now lost. And it is independent of language.

Paul F. Clement Jr.  
Product Planning Manager  
Edutronics Systems International  
Chicago, Ill.

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November 11, 1970

Page 13

## Capex Cobol F Optimizer Cuts Object Programs 30%

**PHOENIX, Ariz.** With the Optimizer package, available from Capex Corp., OS/360 users can reduce Cobol F object program size by an average of 30% and use the core saved to speed execution of the program, or run additional programs.

Capex said that a version of Optimizer is also being developed for AS/400 cobol.

The package reduces CPU time by stripping the compiler-generated code that does not apply to the program being optimized.

Further, Capex said that Optimizer cuts execution time of I/O-bound programs by generating extra I/O buffers and/or allowing the OS chained scheduling capability, which reduces channel and wait time, to be activated.

Optimizer is transparent to the

user. No changes in the Cobol source code are required and no changes have to be made to the operating system. The package can be used under any of the OS options, including PCP, MFT or MVT.

Capex explained that Optimizer reduces the size of an object program by eliminating register loads, address constants and perform linkage code. Capex emphasized that Optimizer cannot improve programmer logic; it can only strip unnecessary code instructions generated by the programmer's source statements.

The Optimizer requires a region of 128K bytes or a region as large as the object program, whichever is larger, and direct access storage for temporary work-files. The package will optimize single object program

modules up to 512K bytes in size.

Execution time of the Optimizer process is generally less than 50% of the compilation time, according to Capex, but varies depending on the structure of the object program being optimized and the CPU on which the optimizing is being

done.

The program listing generated from Optimizer includes the optimizer code, in optimized form, interleaved with the source statements that generated it, for ease of debugging. The system also provides a report highlighting any problems encountered, and unresolved, by the Optimizer.

The Optimizer for OS/360 Cobol F costs \$15,000 plus \$1,000/yr for maintenance after the first year. The company also noted that the ANS Cobol version, when ready, would be available to users of the Cobol F Optimizer at reduced cost.

Capex Corp. is at 2613 North Third Street.

## NSF Project Sells T/S Programs For \$1 Apiece

**BELoit, Wis.** Time-sharing programs covering a wide range of applications are available at token costs, through a project funded by a National Science Foundation Grant, and Beloit College.

The Social Sciences Instructional Project (SSIP) has acquired programs from many sources and adapted them to a time-sharing mode. The programs cover a wide diverse array, including psychology and operations research.

Most are written in Fortran IV for easy implementation on many CPUs, including, thus far, the IBM 1800 and 1130, CDC 6400 and Burroughs 5500 processors.

The programs presently available include a terminal version of a financial simulation package, with new options, and a large, interactive world politics simulation game. Others are said to provide practice in elementary probability and experimental methods for psychology students.

Those interested in operations research can use SimuQ which simulates the behavior of queues or waiting lines under a wide variety of assumptions concerning distribution of arrival and service time.

Probability and Statistics programs include one that generates up to 250 random numbers from a normally distributed "population" with mean and variance chosen by the user. Others include adaptations of IBM's Scientific subroutines Tab1 and Tab2, which tabulate the actual and the percentage frequencies of data over equal class intervals.

The Analysis program provides analysis of variance and Mrcap is said to perform multiple regression, correlation, analysis of residuals and least square predictions.

Single copies of the specifications of these and the other programs in the SSIP library are available without charge. Complete listing of any specific program is available for \$1, while printed card decks for each program are priced at \$1 plus postage.

One or more programs will be copied onto a single magnetic tape for \$5. To take advantage of this option, the user must provide a 800 bit/in. 9-track tape.

The Social Sciences Instructional Project is under the Department of Economics and Business at Beloit College, here.

## Basic and APL Available on TSR

**NEW YORK** - Time Sharing Resources (TSR) has added Call/360 capabilities to its service and, as a result, the user has a choice of APL or an enhanced version of Basic on the same network.

TSR noted that Call/360 also supports PL/I and Fortran IV, giving users more flexibility of language. Restating his feeling that APL is an ideal time-sharing language, a TSR spokesman said that users still want or need other options. The Call/360 implementation seemed the best way to provide them, he added.

In addition to expanding the choice of languages on its service, TSR has recently added a remote job entry capability, permitting data entry and analysis from terminals at speeds up to 2400 bits/sec.

TSR users are charged \$11/hr for connect time and \$6/min CPU time, with one minute CPU free for every connect hour. The storage rate is \$1.50 for every 7200 characters. There is no minimum charge.

TSR has its offices at 22 West 48th Street.

## RCA's Guaranteed Software Conversion Contract Seen As Real Benefit To User

**BOSTON** — RCA's guaranteed software conversion contract can be of very real benefit to the user, according to several software houses that have signed on to the own-in-house conversions from DOS/360 to RCA Tape Disk Operating System (TDOS).

Under RCA's conversion plan, current DOS users of IBM 360/30s, 40s and 50s would be guaranteed successful conversion support to the RGA 2, 3, 6 and 7, for a negotiated fixed price based on complexity of the programs.

Culmann Corp. anticipates that RCA should have little trouble in the instruction/prerelease sections of the converted

programs. Somewhat more trouble, but still nothing serious, may occur in the environment section of Cobol conversions. The main problem is that there are significantly different Job Control Language (JCL) requirements between the IBM and RCA operating systems, the company said.

Informatics agreed that the operating system interfacing is the most significant difference. Although the functional differences between the IBM and the RCA access methods is even more important than the differences in the JCLs, Informatics said.

Applied Data Research reiterated the importance of the

operating system interface problem and wondered whether RCA could in fact provide a service to help users to successfully convert highly complex programs. ADR admitted, however, that RCA could undoubtedly handle "run-of-the-mill" programs, and that this would be good enough to serve the needs of most users.

RCA probably can write a simple program to convert IBM's Cobol management clauses into RCA acceptable format. Culmann surmised, in the production division, there are few enough discrepancies between IBM and RCA verbs so that a short checklist would serve to spot those that need re-coding.

## Firm Plans Organic Compound Data Base

**CLEVELAND** — A tape-oriented database describing approximately 15,000 organic compounds will be available next summer, according to the developer, Science Databank Inc.

The Codah/Otchem data base contains of organic compounds from the Handbook of Chemistry and Physics, plus related material. The data base is organized sequentially, based on the handbook compound number. Records for each compound

include digitized representations of the infrared, ultraviolet and nuclear magnetic residue curves, the Chemical Abstracts Register number and the Werner-Brügel number. The data base compound has a "directory" entry which defines the records in detail, SDB said.

The company said the data base would allow the user to get specific information on a given compound or to determine all compounds with a given characteristic. Relationships between properties, and between properties and structural characteristics

can also be extracted from the file, the company said.

About to be tested on a prototype basis, the data base is expected to be available in either Ehdic or Ascii format, on 9-track 800 bits/in. magnetic tape.

It will cost \$60/mo for the first installation, on a three-year lease. SDB said that the data base may also be made available through a time-sharing service. Science Databank Inc. is at 18901 Cranbrook Way,

## VIP Text Editing Available as Service, Package

**WASHINGTON, D.C.** Large-scale installations and others with special needs to keep all their processing in-house can buy or lease a text-editing package, previously available only as a time-sharing service, from VIP Systems Corp.

VIP said that VIPcom '71 is an enhanced version of the IBM Administrative Terminals System (AT/TS/360), containing more than 100 modifications and extensions of the standard IBM-supplied package.

The company said that many of the changes improve the reliability and eliminate errors inherent in the original software. Others provide usage statistics and improve data center operations, including the monitoring of communications facilities.

Another series of changes provide extended capabilities for the terminal users, including online, remote batch and video composition features. VIPcom '71 is a stand-alone system with

is capable of producing "typewriter" formatted reports on the user's in-house high-speed printer.

The packages also include an interface with VIP's photocomposition services, which are not included in the software being made available now. The photocomposition services utilize Photon equipment to produce proportionally-spaced type set reports.

Written in BAL, VIPcom '71 has been implemented under DOS/360 and could be used on other processors that support BAL. The system requires at least 48K bytes of storage, the company said.

Purchase price for VIPcom '71 is \$25,000 plus \$500/mo for maintenance. Rental is \$2,495/mo with credit towards purchase.

On a time-sharing basis, VIPcom '71 capabilities are available for \$2.50/hr of connect time, with no charge for CPU time.

Charges for printing and storing of data vary with the user's needs, the company said.

VIP has local lines available in Boston, Chicago, Cleveland, Los Angeles, Philadelphia, San Francisco and through its Washington, D.C. headquarters at 1145 19th St., N.W.

## Book Provides Conversion Tables for 360 Programmers

**NEW YORK** — A small book published by Programming Science Corp. (PSC) allows 360 programmers to find hexadecimal and decimal conversion tables. It also provides conversion tables for direct conversion of binary to hexadecimal and from 0 to 65,535 in decimal, directly.

The use of the Hex Conversion Tables requires no addition or subtraction to arrive at conversion values. With direct conversion values, the Hex Conversion Tables book sells for \$3.

Programming Science Corp. is at 5 E. 42nd St.

# T/S Service Includes Financial Analysis for Planners

RICHMOND, Va. — Corporate planners can use a Financial Analysis System, now available on the Action/APL time-sharing network, to analyze historical data to develop projections from historic data and/or forecast future situations.

Regardless of the method of analysis followed, the planner is not required to have any understanding of programming to generate his reports, according to network spokesman.

Once historical data has been entered, it may be altered to reflect changes, but otherwise will be retained and available to use as often as the user wishes.

The reports include spread sheet, a percentage spread sheet and a spread sheet trend analysis. Funds flow and cash flow reports are also possible, as are ratios and ratio analyses. A reconciliation of equity completes the report series.

While more than 80 line items are programmed, the user may change any and all the line titles to suit his special requirements.

Once historical data has been entered, it

will flag any improperly balanced columns and will assist in the audit phase of the analysis.

Network spokesman noted that only through the use of APL as the source language were they able to make the analysis system as flexible as it is. Other languages are too restrictive, he added.

The Action/APL "network" is national in scope and is a cooperative effort of four APL-oriented companies: The Com-

puter Company, here; APL Services, Inc., New York; Computer Innovations, Chicago; and Proprietary Computer Systems, Inc., Van Nuys, Calif.

When the network was organized [CW, Aug. 26], spokesmen noted that a nationwide price schedule would "probably" be developed in time. For the moment, however, prices for the service vary from region to region.

Proprietary Computer Systems is at 16555 Saticoy St., Van Nuys, Calif.; while Computer Innovations is at 10225 South Western Ave., Chicago. The Computer Company is at 7th and Franklin.

## Service Firm Adds Two Offices

ATLANTA, Ga. — Lykes-Youngstown Computer Services Corp. (LYCSC) has opened operating centers in Dallas and Houston, Texas.

The firm handles commercial data processing services and offers proprietary software packages and custom programs. The Dallas center initially will be offering a newly developed stock broker account-

ing package in cooperation with two other Dallas firms, Affiliated Computer Systems, Inc., and The BVR Corp.

Other LYCSC centers are Atlanta, Cleveland, New Orleans and Tampa.

Lykes-Youngstown Computer Services Corp. is headquartered at 1447 Peachtree St. N.E., here.

# Why install a ROYCO 205/108 memory protector after you suffer a head crash?

The time to detect and prevent hard input/output errors or a disastrous computer memory head crash is before it happens. Not after your on-line computer has lost its memory. After all, your random access memory devices must be reliable. The penalty is a costly computer failure.

But, memory devices do fail. Remember, they're extremely close tolerance devices made and used by people. That's where we come in.



ROYCO 205/108 Head Crash Prevention System in Service Protecting an IBM 2314 Disc Drive.

Our ROYCO Model 205/108 Head Crash Prevention System will detect and prevent head crashes and hard input/output errors. It's a memory protector. That's it's job.

How does it work? Simple. The density of particles manufactured inside the memory system is continuously monitored. Internal particle concentration caused by aerodynamically unstable read/write heads, warped or damaged discs, edge loading or other malfunctions that affect head/memory surface operating tolerances is detected. Before it becomes critical, the head crash can occur!

The ROYCO Model 205/108 memory protector gives operators audible/visual warning and automatically retracts the heads if desired. To prevent hardware and data destruction, to avoid hard input/output errors. To hold computer downtime down.

That's positive protection. That's what the ROYCO 205/108 memory protector is all about. Besides at \$49.50 a month you can't afford to be without it.

Write us for full details. We're compatible with most memory systems in use today. Or call us collect. The memory protector is available now.

## AI/Com Adds Advanced Circuit Design Capability to Network

PRINCETON, N.J. — Match, a circuit design program, is available via the AI/Com Time Sharing Service of Applied Logic Corporation. Developed by Applied Logic, Inc., Burlington, Mass., Match is said to offer features not generally available in any other program for design of circuits employing filters, passive networks and logic minimizers.

Optimization, the program's most unique feature, allows engineers to automatically vary the circuit parameters to improve their designs.

Other Match innovations are: ability to perform group delay calculations; convenient simulation of component values; graphical output including a Smith chart and expanded Smith chart; plotting; tables for entering empirical frequency responses; tables for entering rational functional data; capability to

analyze very large cascade circuits. Match also can calculate the signal transfer ratios of circuits with Z, Y, G, H, ABCD and scattering parameters.

Engineers can plot up to 10 curves on a single graph, notebook size. All results may also be output in tabular form. Engineers can choose their output in single precision (five significant figures) or double precision (ten significant figures).

There is no initiation fee, but, after three months on the network, there is a \$100 minimum monthly billing. Charges are accrued at \$10/hr for connect time and ten cent/\*core unit," a concept based on amount of core storage, time and I/O accesses used.

Applied Logic Corp. is headquartered at 1 Palmer Square.

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- Offers a complete software/hardware operating system.
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- Can pay for itself in 114.9 hours of run time.

To give your minicomputer the system capabilities and efficiencies of multitransport mag tape, call (collect) or write Dicom for more information or a demonstration.

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(408) 732-1060

November 11, 1970

Page 15

# Westinghouse 2500 Is General-Purpose Minicomputer

By Frank Plasta  
Staff Writer

**ORLANDO, Fla.** — The list of available 16-bit minicomputers has been extended with the addition of the first of a new line of small CPUs from Westinghouse.

The general-purpose Westinghouse 2500, based on the company's P 2000 computer control units, is intended to appeal to users for industrial, communications, and scientific applications.

The 2500 resembles several currently available or recently announced minis in both price and performance. The cycle time of 850 nsec compares favorably with the faster avail-

able minis. The recently announced Data General Nova 2000, for example, will have a cycle time of 900 nsec, while the PDP-11/15 is scheduled to be increased in speed to 890 nsec next April. The leader in speed in this price range, though, is the Varian 620/1 with a cycle time of 600 nsec.

From a price point of view, the Westinghouse unit, at \$9,950, is somewhat higher than the approximately \$7,000 price of the PDP-11/15 and Nova 800.

The 2500 does, however, include as standard equipment features that are extra-cost options on some competitive machines. These include double-precision

arithmetic and hardware multiplication division.

The 2500 seems to be unusually well adapted to use in data acquisition, communications and real-time process control environments through its I/O system.

As many as 128 direct I/O chan-

nels are available. Up to 120 external devices are available in groups of eight. Direct memory access is also available.

Peripherals include teletype-writers, paper tape, punched card, magnetic tape, line printer, fixed and movable head disks, CRT display, contact closure

controllers, and analog I/O sys-

tems.

Software for the 2500 is based on that developed for use with the company's P 2000 units and is compatible with that system.

First deliveries of the Westinghouse 2500 are scheduled, for the second quarter of 1971.

## Low-Cost A.B. Dick Desk-Top Device Makes Hard Copies From CRT Display

**CHICAGO** — Priced at one-third to one-half of similar units, the A.B. Dick direct image desk-top copier makes hard copies

from a CRT display.

Interfaceable to 75% to 80% of current displays, according to the company, the Model 9750 Display Copier can be used for both alphanumeric and graphic output.

The copier can be remotely operated by locating print controls in the CRT station, making it practical for several stations to share a single copier.

The unit produces dry copies by an electrostatic process. Copying speed is 12 seconds for the first copy and eight seconds for successive copies.

Paper handling capacity of the copier is a 460-foot roll. The unit can also hold a 350-foot roll of master paper for offset reproduction.

Standard image size is 8-1/2 in. by 8-1/2 in. A unit that can produce 10-1/2 in. by 15 in. copies is available on special order.

The standard copier is furnished with an industrial grade nine-inch CRT monitor. The monitor accepts EIA standard video signals for 525-line black-and-white television systems. The unit is also available without the monitor.

The copier is priced at \$2,660 in the standard version. Without the built-in monitor, the unit is priced at \$1,980. Both versions are currently available on a 15-day delivery schedule.

A.B. Dick Co. is at 5700 W. Touhy Ave.

## Portable Terminal Outputs Hard Copy

**STAMFORD, Conn.** — A low-priced portable communications terminal from Data Products Corp.'s Telecommunications Division produces hard-copy output.

The basic unit has a large price of \$399 and a purchase price of \$350. A typical installation, the company said, consisting of a terminal and communications and control units, buffered and interfaced to a System 360, would rent for about \$55/mo.

First shipments are scheduled for December 1, 1970.

The unit can also hold a 350-foot roll of master paper for offset reproduction.

The Telecommunications Division of Data Products Corp. is at 17 Amelia Place.



PortaCom Terminal

**Thin-Film Circuit May Replace Mechanical Card Reader Sensors**

**PRINCETON, N.J.** — A thin-film experimental circuit that could be used to replace at lower cost the mechanical or photodiode sensors in punched card readers has been developed by RCA labs.

The circuit, laid out in a crossed pattern, is a form of integrated circuit 5,000 times larger than the standard type, according to RCA. It is a flat array of 960 photoconductive elements, plus auxiliary components and interconnections, deposited on a four-by-eight-inch plate of glass.

Because the array is an integrated circuit fabricated on a single substrate, RCA said, the circuit could be used in card readers that accept cards less expensive than conventional units, many of which are assembled from large numbers of separate photocells.

In its present form, the circuit is laid out as a computer card reader containing 960 photoconductive elements — 12 rows of 80 elements — to match the 960 positions on a computer card. Wherever a hole has been

punched in a card, the corresponding photoconductive element sense light and, in turn, provides an electronic signal.

In spite of the greater weight of the printing mechanism, the unit weighs less than 30 lb., according to the company, and fits into an attache case.

The PortaCom, the company said, is currently being used in a variety of applications including

computer instruction, banking, sales, medical information systems, and engineering.

The unit can produce up to three carbon copies using sprocket-fed paper. The unit has a built-in acoustic coupler that can transmit or receive at up to 300 bits/sec.

The terminal uses a standard 128-character ASCII keyboard and Teletype-compatible.

It is also designed to interface with tape cassettes through an EIA 22-pin connector.

The PortaCom leases for \$95/mo and sells for \$2,450.

Quantity discounts are available.

The unit is currently available on a 30-day delivery schedule.

## Graphic Time-Share Plotter Works With Terminals

**PALO ALTO, Calif.** — Graphical output in conjunction with IBM Communication Ter-

inal is obtained with a new graphical plotter from Hewlett-Packard.

The Model 7201A is an abso-

lute coordinate plotter that develops graphics by drawing vectors or plotting points.

Backup software or previous programming knowledge is not required for operation, the company said, and it accepts coded data at 14.8 char/sec.

- IBM Compatible

The plotter adds IBM terminal compatibility to the Hewlett-Packard graphic plotters. The 7200A accepts standard ASCII code at 10 char/sec.

An operator can input data or mathematical functions in source language to time-share systems to produce charts or graphs. Mnemonic codes similar to those used in time-share systems are used to instruct the

plotter.

All points are defined by absolute coordinate pairs so each plotted point is independent of the accuracy of preceding points. Improper data causes the pen to lift; plotting is resumed automatically at the next programmed point.

Plots up to 11 by 17 inches is gripped by the Autogrip electrostatic paper hold-down. Front panel controls allow adjustment of graph limits to fit a plot to any preprinted grid. Several colors of ink are available in disposable cartridges.

The price of the HP Model 7201A Graphic Plotter is \$3,000. Rent/lease plans are available. Deliveries are scheduled to start in 8 months.



HP Model 7201A Graphic Time-Share Plotter

## Cartridge Tape Cartridge Transport Uses Revised Data Recording Format

MOUNTAIN VIEW, Calif. — An upgraded version of the Cartridge magnetic tape cartridge transport for minicomputers uses a revised data recording format to increase cartridge capacity and to improve data transfer rates. The device can interface with minicomputers from DEC, Data General, and PDP-11/PDP-8.

Called the Model 4196, the unit features four tape loops, each with its own transport, that can hold over 3 million data bits. The system can hold more than 1.4 million 8-bit words when a 1,000 word record format is

used.

The four tape transports in the unit are independently controlled by circuitry that allows the computer to write data on one tape while reading from another. This capability, the company said, expands the mini-computer into a parallel processing system that is able to sort, match, merge, and separate data, with only one cartridge required.

A transfer rate of 18,000 bits/sec enables the Cartridge 4196 to transfer 16-bit computer words at a rate of 1,000/sec. The rate for 8-bit words is 1,800/sec.

The 4196 uses bi-track data format, a bit-serial, phase-encoded recording technique. The bi-track format uses only the two center tracks of the tape, which, the company said, eliminates the need for data errors due to off-track data.

The Cartridge 4196 is available complete with interface circuitry and software for use with small computers such as the PDP-8, Nova, HP 2114, 2115, 2116, and others. Cabling and necessary electronics are provided.

The Cartridge 4196 tape system is priced at \$6,050, fully equipped. It is currently avail-

able on a 45-day delivery schedule. Tri-Data Corp. is at 800 Maude Ave.

### Improved Version of XDS Mini Features Faster Cycle Times

EL SEGUNDO, Calif. — XDS has unveiled an improved version of its CF16A mini.

Varying from its year-old predecessor in having a faster memory, the CF16A in other ways is compatible with its predecessor.

The use of more advanced technology enables the new model to have a cycle time of 1.6 usec, as opposed to the 2.67 usec time of the older device.

Designed for applications in industrial, educational and aerospace environments, the 16-bit mini features a 126-instruction set, memory that can be expanded from 4K to 32K words, I/O transfer rates as high as 1,000 word/sec, and a variety of peripherals.

Software includes an assembler, basic Fortran compiler that can operate in 4K, utility and diagnostic programs, and a library of math routines.

Peripheral equipment available includes:

- fixed disk storage, magnetic tape,

- punched card input, punched paper tape

- equipment, analog/digital converters, and communications interface.

A typical 8K CF16A configuration, according to XDS, with real-time clock, three levels of priority interrupt, memory and disk peripherals, and tape read/write, controller, and teletypewriter will sell for approximately \$17,000. The first units are scheduled for delivery in November, 1970.

### Varian Text-Setter Faster Than MT/ST

IRVINE, Calif. — Output of camera-ready text at the rate of 200 pages-per-hour — 20 times faster than presently used systems — is claimed for an automated text-setting system from Varian Data Machines.

Varian said the system, called Varitext, cuts revision time 90% as compared with IBM's MT/ST systems. Varitext combines digital tape transports using Philips-type cassette, a line printer to produce revised drafts, and a terminal to link minicomputer to automate all operations.

Typical Varitext systems will lease from \$2,000 monthly, depending on configuration and number of terminals. Deliveries are scheduled for early next year.

### Video Systems' Recorder Uses Philips Cassettes

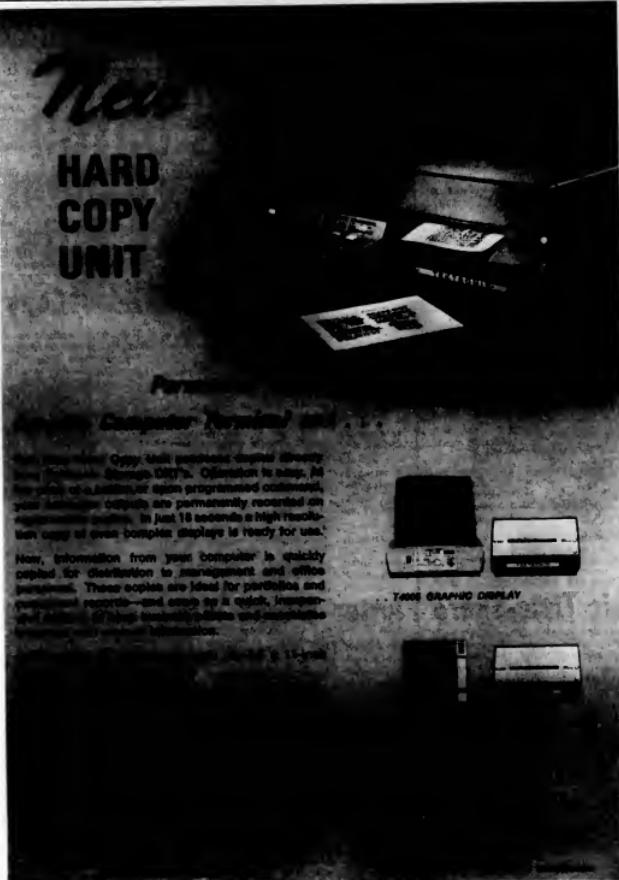
PENNSAUKEN, N.J. — A cassette tape memory recorder from Video Systems Corp. is adaptable to any of the firm's CRT terminals.

Called the VST-Termicord, the recorder can be plugged directly into any of the Video Systems terminals. It is designed to use Philips-type C-60 cassettes.

Data is recorded and reproduced at 500 bits/sec. Packing density is 250 bits/in. Up to 850,000 bits can be stored on a cassette.

The Termicord is priced at \$1,695 and can be leased for \$55/mo on a one-year lease.

Video Systems Corp. is at 7300 N. Crescent Blvd.



See The Tektronix Display At FJCC



Model 4196 Cartridge Tape System

## EverOn Supplies Power for Computer

SANTA ANA, Calif. — The EverOn Power Processing Unit, from Gates Learjet Corp., Static Power Division, "precludes brownouts" and their effects on

### dp accessories

computers. The device regulates commercial electrical power.

The basic configuration can also supply a computer with power for up to five hours. With extra batteries the unit can supply auxiliary power for a longer time.

The price of the basic unit is \$30,000. A five-year lease which includes delivery and installation is \$800/mo. Delivery is 120 days.

Gates Learjet Corp., Static Power Division, is at 2001 South Ritchey.

### Systems Supply 1 Hr. Back Up Power

WILLOUGHBY, Ohio — Five standard protection periods, ranging from one minute to one hour are available with various models of back-up power devices from Systems Supply.

Called the Fourth Generation Static Interruptible AC Power Systems for Computers, the systems are available in 40 standard ratings from 10 to 120 KVA.

The price of the systems range from \$13,500 to \$102,000. Delivery is about five months, the company said.

Cyberex, Inc. is at 4399 Industrial Parkway.

### 700C System Can Use Diesel Generator

RICHMOND, Va. — A system from Power Systems and Controls, Inc. provides five minutes of continuous power after the normal supply has failed.

In the Series 700C, the equipment is designed to prevent "brownouts."

A diesel-driven generator can be added to the system to provide continuous power in case of loss of utility or of failure.

The system is priced from \$30,000 for a 40 KVA unit to \$500,000 for systems rated at 1,500 KVA.

Power Systems and Controls, Inc. is at 3206 Lanvale Ave., "Energy Package" Can Be Leased

FAIRFIELD, N.J. — Airoval Manufacturing Co. offers auxiliary power systems that can provide computer power for periods of time from 15 minutes to one hour.

For longer time periods, a diesel generator can be added to the Airoval Continuous Energy

### Package.

The smallest unit, rated at 10 KVA, is priced at \$30,000. The largest, with a rating of 500 KVA, carries a price of \$100,000.

The units are available on a lease basis also.

Airoval Manufacturing is at 19 Gloria Lane.

Gates EverOn for 360/50

Cyberex System

## INTERNATIONAL DATA CORPORATION and its European affiliate IDC EUROPA, LTD.

### announce that they are currently conducting a study of the European Data Capture Equipment Market

*The results of this survey will for the first time provide accurate data on the data capture market throughout the major European market centers.*

*Requests for further information on this study should be sent to:*

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*IDC is the leading market data gathering, research,  
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**Dallas, Texas 75235**  
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## OCR Handles High Volume Input, Punches Data Directly In Cards

PALO ALTO, Calif. — Intended for the user that processes thousands of 9,000 invoices per day, an optical scanner from Data Recognition Corp. reads imprinted documents and punches the data into tab cards.

The Model 710, the company says, was developed for use in the bank credit card industry, the retail store trade, hospitals and the oil industry.

Capable of processing up to 6,000 documents per hour, the machine can be used to replace keypunching. It is a stand-alone device requiring no computer control.

The IBM device most nearly comparable to the Model 710, Data Recognition said, is the 1282 optical reader/punch. Less

expensive, this IBM device reads only alphanumeric data and three special characters from 51-column and 80-column cards and punches the data into the same cards at a maximum rate of 200 card/min.

The Model 710 uses the company's own optics and recognition technology that was developed for its Model 700 OCR/R-to-microfilm film.

The new device reads Farnsworth 7B font, commonly used in credit card and similar applications. Output is through a standard 100 card/min punch.

First deliveries are expected to be made in June, 1971.

The price of the Model 710 is expected to be about \$85,000. Data Recognition is at 908 Industrial Ave.



Gerber System 1223

## Gerber Digital Drafting System Includes Text Symbol Generator

SOUTH WINDSOR, Conn. — An all-digital drafting system, manufactured by Gerber Scientific Instrument Co., uses a Hewlett-Packard minicomputer as a control device.

The System 1223 has a wide range of capabilities, the company said, permitting the conversion of all types of data into graphic form.

The system is said to be suited for both office and field use. It consists of a general purpose Model 1220 stored program controller, an interface for matching the computer output to the Series 23 drafting table, computer peripheral devices for data storage, and software for directing operation of the system.

An additional feature is a symbol generator which utilizes

core-stored alphanumeric text symbols and allows full rotation of text messages, Gerber said.

The system features a 400 char/sec punched paper tape reader, a 100 char/sec magnetic tape reader, and a standard I/O teletypewriter for manual input and operator message output. Magnetic tape input is also available as an option.

It has applications in such areas as space vehicle tracking, intelligent display, map plotting, statistical analysis, logic diagrams, schematics, logistics, and aircraft and missile design.

The System 1223, in its basic configuration, is priced at \$80,000. It is available on a three to four month schedule.

Gerber Scientific Instrument nt is at 83 Gerber Rd.

## Printer and Card Reader Add to Qantel System

HAYWARD, Calif. — A medium speed line printer and a compact card reader have been introduced for use with the Qantel V business computer by Qantel Inc.

The line printer will handle Qantel V data at the rate of 200 line/min. It will sell for \$11,500 outright or lease for \$355 a month including maintenance.

The card reader is fully buffered and will read standard 80-column width half-length coded cards. It translates data into binary code. The price of the card reader is \$3,950. It will lease for \$122 a month including maintenance.

The Qantel V system is a business accounting center which can also operate as an intelligent terminal in a computer network environment. The addition of new printer and card reader are said to add flexibility and usefulness to the system.

Qantel is at 3474 Investment Blvd.

## Channel Allows PDP-10 To Use PDP-11 Front-End

BEDFORD, Mass. — A device that allows a DEC PDP-11 mini to be used as a front-end processor for the PDP-10 timesharing system has been developed by Bedford Associates, Inc.

Called the Data Channel, the unit provides bidirectional programmed data transfers between the 16-bit PDP-11 and the 36-bit PDP-10.

According to the company, the device could find use in such applications as communications processing and data concentrator. It could, for example, be used to set up an automatic data gathering system for manufacturing plants to process data for an MIS.

Transfer rate for 16-bit words is 850K bit/sec, while 32 or 36 word bits can be transferred at 1,500K bit/sec.

The channel is so designed, the company said, that the PDP-10 controls the operation of the channel. The PDP-11 can, therefore, do its own processing.

The device offers program selection of the following transfer modes: interrupt,

non-interrupt, and half-word (16 bits).

A display panel provides read-out of channel states.

The Data Channel is priced at \$9,800. It is currently available on a 30-day delivery schedule.

Bedford Associates is at 75 Wiggin Ave.

## Tape Handling

HOUSTON — A punched paper tape handling system has been introduced by Houston Scientific Industries, Inc.

The system, known as the Autotape-3, is designed to be mounted directly on the ASR-33 Teletype.

The company is at 4202 Directors Row.

# According to our calculations, there are 12 reasons why you should visit Booth 3516 at the FJCC.

### Here they are:

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We're looking forward to seeing you at the FJCC November 17 thru 19 — Booth 3516. Ask us about our new prices and pricing policy. And if you can't make the Conference, write for complete details on our new products. Graphics Division, Gould Inc., 3631 Perkins Ave., Cleveland, O. 44114.

One of the reasons:  
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**GOULD**

# AT & T Calls Johnson Biased, Asks Disqualification

**By Don Levitt**  
CW Staff Writer

**NEW YORK** — American Telephone and Telegraph Company has asked Federal Communications Commission Commissioner Nicholas Johnson to disqualify himself from participating in FCC matters involving Bell System companies.

In a "petition for disqualification"

"addressed to the Commissioner, AT & T characterized remarks Johnson made on Oct. 19

## Communications

in Chicago as demonstrating "a deep-seated bias and prejudice against the Bell System."

## Bell Admits Demand, Says It Can Meet Data Needs

By Ronald A. Frank

CW Technical News Editor

**NEW YORK** — Acknowledging an ever increasing demand on the part of computer data users for improved communications facilities, AT & T officials said last week that the Bell System could best meet those needs.

Appearing at a special session held here and transmitted via closed circuit TV to Washington and Chicago, were Richard Hough, president of AT & T Long Lines, Kenneth McKay, vice-president for Engineering, and Samuel Bossack, vice-president for marketing and services.

Bossack said that recent market studies indicate a total data market worth two billion dollars by 1980. He cautioned, however, that "the demand for data will not outstrip voice [facilities] demand by the end of the 70s."

When asked whether AT & T considered specialized carriers such as MCI, and potentially Datran, as competitors, Bossack said these type of firms were not yet providing data users with services.

### New Hearings Needed

Asked whether Bell would compete when the new carriers began operating, Bossack said that it was first important whether the new carriers "are in the public interest." He called for a new set of hearings by the FCC to determine "the public need." He added that AT & T would "compete aggressively" in the field of data communications with any new carrier.

On the question of price averaging whereby Bell spreads network costs evenly over its entire network, Bossack said that if the new carriers offer data rates lower than AT & T on the more densely used routes Bell would have to react.

Pressed on this issue, he said that AT & T would "have to take a look at the rates on the routes where it had competition. He predicted that such selective lowering of rates could quite possibly result in rate increases on less densely used routes throughout the Bell System. He added that speculation about such modifications in Bell's pricing policies was still premature.

McKay said that today the "average data phone is operating at 2,000 bits/sec and experiencing an error rate of 5 bits in every 10 million bits transmitted."

### DAA Maintenance Is Vital

Discussing the interconnection of non-Bell equipment with the Bell System, McKay told CW that AT & T would sanction the incorporation of DAA devices within non-Bell equipment only if Bell were able to retain responsibility for the maintenance of the devices.

Speaking of future methods of data transmission, Hough predicted that guidelines would be issued by the Bell System by the late 70s and laser-controlled fiber optic pipes were a possibility for the early 80s.

**Pennel Unit Can Replace 101C**  
**SILVER SPRING, Md.** — The ITY-300 modem designed for installation within a Model 33 Teletype, is a replacement for the Bell 101C, and is available from Pennel Data Communications Inc., 960 Thompson Ave., here.

The Johnson speech, delivered at the Digital User's Association meeting, ICW, Oct. 28, was subtitled "For Whom Does Bell Toll?" During the discussion, management had been urging policies that don't even serve the company's interest."

"Not atypical of a basic AT & T failing," Johnson said, is the situation in New York which "serves to illustrate the long lead time required for Bell to respond to TD 2 microwave expansion." He added that "Bell's planned expansion was replaced by high cost crash programs. Many customers went unserved."

He said that in the past few years, "we have seen an increasing erosion of the privacy and integrity of the telephone system."

He added that Bell had "no strong opposition" to wire-

tapping, and said that in fact he had heard reports of "local company cooperation with all types of communications intercept."

He also cited TD 2 microwave as an example of Bell's lack of technological supremacy. "Competitors," he said, "had jumped ahead in developing this particular type of microwave. Bell seems to take a slow effort to catch up."

Whether this crash effort would have been successful without Bell's basic monopoly advantages of FCC protection of Bell-maintained barriers to competitive entry cannot be determined.

Later he noted that "some of the most disheartening and fascinating of Bell's management errors" involve the telephone service itself.

AT & T said that the specific accusations and charges Johnson made in his speech were without merit and factually unsupported. The company said it had countered the charges in a public speech, the company said, is entirely incompatible with the dispassionate objectivity required of his high office as a public regulatory official.

Many of the issues raised by Johnson, the company said, are now pending before the FCC in proceedings in which Bell System companies are entitled by law to an impartial and objective determination.

According to the ATT petition, Johnson said that he will consider it "most seriously" and admitted "it is understandable why Bell management would want to silence me."

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# Technical Sessions Stress Systems Aspect of Theme

HOUSTON — Four-and-twenty subjects, and then some, will be discussed during the technical sessions at next week's Fall Joint Computer Conference here. Most deal with systems, generally, but few talk about the latter part of the slogan "Systems and Society."

With no sessions to compete with H. Ross Perot's keynote address, the opening technical meeting will be at 12:30 Tuesday afternoon. In most cases conflicting meetings do not overlap in discipline or probable interests of attendees.

The Tuesday sessions deal with programming, memory systems, and design, and, as is the case with all other technical meetings, will be held in the John Mohr Auditorium. The sessions include the topics:

Session I is entitled "A Spectrum of Programming Languages." Panel topics include ways of circumventing problems discovered in traditional programming practice.

2 - 12:30-2:30 - "Three State-of-the-

Art Memory Systems." Topics are Cache Memory Design, a large MOS/FET Memory, and an on-line mass storage system. 3 - 12:30-2:45 - "Design for Reliability." Papers deal with methods of testing "the newer computer logic [which] is becoming more difficult to test because of added complexity, pin limitations, different failure modes, and newer wear-out phenomena."

4 - 3:15-5:30 - "Operating Systems and Schedules." A panel will review system performance in light of scheduling and allocation strategies, system tuning, and system monitoring.

5 - 3:15-5:30 - "Aerospace Applications." Papers discuss computational devices or techniques in the "typical aerospace industry simulation facility."

6 - 3:15-4:45 - "Survey of Computer Procurement in Research and Development Techniques." Overview of R&D requirements, plus a detailed look at computer contracts.

## Wednesday Morning

7 - 8:30-9:30 - "Multi-Access Operating Systems." Describes two relatively new computers which "take on the functional characteristics of much larger machines" when attacking the general-purpose software problem.

8 - 8:30-10:30 - "Analysis of Information Retrieval Systems." Analysis at three possible levels, and the question of protection of information in a resource-sharing environment.

9 - 8:15-10:15 - "Computer-Aided Undergraduate Instruction." Thesis: The educational process is substantially enhanced by (these) methods implemented on computers.

10 - 11:30 - "Computer Communications, a Burgeoning Industry, Part I." (Part II is Session 13, after lunch.) Establishing computer networks; selection of facilities; based on trade-offs; implementation of computer-controlled

communication networks, hardware and software; interconnecting.

11 - 10:45-12:15 - "Computer-Aided Design." Systems to organize design-data software and promote its efficient utilization, and an interactive graphics language.

12 - 10:30-noon - "Interfacing Computers and Education." Following formal presentation of papers, authors review their experiences and reactions in this interdisciplinary field.

## Wednesday P.M. Sessions

13 - 2:45-3:30 - "Computer Communications...," Part II, panel discussion.

14 - 1-3 - "Time-Sharing Systems." Addresses the use and philosophy of T/S, plus terminals, applications, dedicated systems, and the like.

15 - 1-3 - "Hybrid Systems." Three papers discuss multiprogramming, the Digital Differential Analyzer, and electronic patching, showing the programming of a complex problem.

16 - 3:30-5 - "Simulation Languages and Systems." Three papers, each on a specific language, plus one on simulating traffic control, and the fifth presentation of simulating voice processing.

17 - 3:30-5 - "Art, Vice and Games." The use of computers in "unusual and exotic applications," including music, sculpture, bridge, even crime.

## Thursday Morning Sessions

18 - 8:15-9:15 - "Computers and Manufacturing." Two presentations, one dealing with IBM's ideas on process control, the other with testing Western Electric's manufacturing line. Emphasis on real-time speed and sophistication, and development efficiency.

19 - 8:15-9:45 - "Automata and Switching." Statistical coding theory and formal automata theory, as applied to controlling the generation and transmission of data.

20 - 8:15-9:45 - "Computational Efficiency and Performance." Relating costs to accuracy, also disclosure of an efficient technique for analyzing program running time.

21 - 9:30-11:30 - "Long Range Goals of Programming Languages," a panel discussion. Three approaches are reviewed formally: universal language, application-oriented language, and extensible language. Relevant problems are discussed.

22 - 10-11:30 - "The Effects of Government Requirements on the Computer Industry," or the Government as a customer. Panel discussion, featuring Rep. Jack ("Brooks Bill") Brooks, Dr. H.R. Grosch, and Joseph F. Cunningham, Office of Management and Budget, as well as representatives of computer industry and user groups.

23 - 10-11:30 - "Time-Shared Text and Information-Handling." The use of the computer for quick response to human information and text-handling needs.

## After Thursday Luncheon

24 - 2-5 - "Communications and On-Line Systems." A survey of evolving problems, examination of new applications, and disclosure of hardware and software developments satisfying real-time demands.

25 - 2-5 - "Selected Computer System Architectures." Three contributions to the idea that software costs and complexity can be decreased by representing certain concepts and structure in hardware.

26 - 2-3-30 - "Prospects for Analog-Hybrid Computing." An introduction on applications, technology, a "tutorial" review, all followed by panel discussion.

The day-and-a-half sessions entitled "Broad Perspective" are dedicated with other news of the conference. They will be presented during most of the session on Tuesday and Wednesday.

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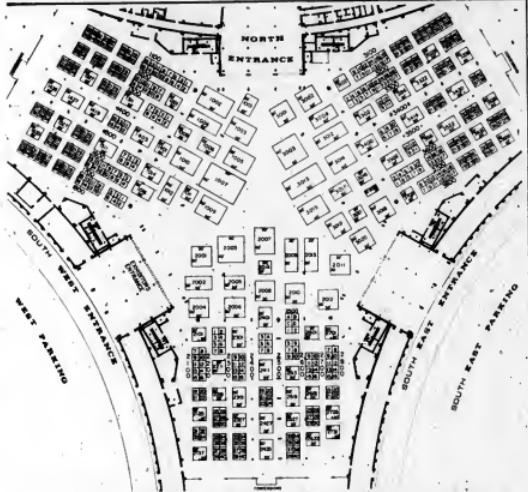
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## Wending Your Way Through the Maze

Visitors to this year's Fall Joint Computer Show will find it a little easier to wend their way to the various booths they intend to visit. Standing at the center of the Astrohall, site of all exhibits and technical sessions, the attendee will see three legs, or sections, emanating. Each leg is a number in a thousand-series,

that is, the Northwest leg is 1,000, Northeast is 3,000, and the South leg is 2,000. Furthermore, the aisles are numbered by the walking space, like a city street, and not by the booths, as in previous years. For example, walking down "2400 Street," both 2411 is on the left, and 2412 is on the right.

# THE YEAR ENDS HERE

In Computerworld's Special Year-End  
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We'll be combining our Dec. 30 and Jan. 6 issues into one information-packed year-end supplement issue. And no other computer publication offers as many all like Computerworld. Because no other computer publication has fifty news-filled issues to draw from. And no other ED/P news medium has as large an editorial staff to put it all together.

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## Extracurricular Activities Include Barbecue, Tours

HOUSTON - A Texas-style barbecue - complete with live entertainment - special tours of the space center, plus walking tours visiting area computer centers comprise some of the extra events being planned for Fall Joint attendees.

The conference luncheon on Thursday will have two features: columnist/humorist as the main speaker, and the presentation of the Harry Goode Award to Navy commander Grace M. Hopper.

A science theater and a presentation by the U.S. Department of Commerce on its Global Marketing program will round out the special events.

The barbecue takes the place of the traditional conference reception, and will be held opening night, Tuesday, Nov. 17, at 6 p.m.

### NASA Tour

Highlighting the special tours will be a trip to the NASA Manned Spacecraft Center which, according to conference publicity, will emphasize the center's unique capabilities.

To take advantage of maximum opportunity for conference attendees to visit the center, tours will operate from 1 to 5 p.m. Tuesday and from 9 a.m. to 5 p.m. Wednesday, and Thursday.

Chartered buses from the Houston Airport will transport Manned Spacecraft Center will be available on a pay-as-you-ride basis.

The Manned Spacecraft Center will hold open house all day, and guides will conduct visitors through the Simulator Lab, Mission Control, the Centrifuge facility, and through several display areas.

A special tour will be conducted through the I.D.D., Aeronautics-Materials Department at 10 a.m. both Wednesday and Thursday.

Here, attendees may view a computer system used for monitoring life functions during surgery. Open house will be held at the Bio-Maif, Department of Biomedicine.

On Wednesday only, tours will be conducted through the IBM Scientific Center, between 10 a.m. and 3:30 p.m. Computer-generated holograms and kinescopes will be shown and holographic applications will be described.

Kinoflo lenses, filters, and storage devices will also be demonstrated.

Tours through the Texas Transportation Institute will be conducted on Wednesday and Thursday. This facility controls traffic on entrance ramps to the Gulf Freeway through the use of sensors buried in the pavement and a system of 14 cameras and an IBM 1400 computer.

Tempeh school is a tour of the recently completed Houston Lighting and Power Energy Control Center, which houses' ten XDS Sigma 5 computers and associated communications equipment, designed to monitor and control the company's generation, transmission, and distribution systems.

Each day at 2 p.m., a tour to the Houston works of Amoco will be conducted. Here, attendees will see a computer-operated, fully automated, rolling mill.

Several nations will send their delegations to visit the Amoco facilities.

## Mini May Not Get Emmy But It Reaches TV Audience

LOS ANGELES While it may never become a star, a mini-series is receiving a prime time television exposure.

Every other Sunday in KCET's Studio E, a General Automation SPC-12 mini records and displays the results of audience response to controversial questions of the day.

The questions are argued on "The Advocates," a National Educational Television (NET) program presented on alternating Sundays by KCET and WGBH in Boston. Both studios of broadcast origin have an SPC-12 connected to a central computer. A third system is flown around the country to the different cities where remote audiences are gathered each week.

The votes are counted by direct link between the computer and the voting terminals.

Now, Trelegan, manager of the audience participation system, explained that the full tally system consists of 100 response terminals, a telephone call-in monitor, the General Automation SPC-12 computer, and a videotape recorder for display of the results.

Trelegan emphasized that "the vote results stored in memory are not just gross breakdowns of

"yes" and "no," but the individual response of each terminal. This is very typically important for subsequent analysis of the votes.

"Typically," he said, "at the beginning of the program, before the audience has heard the arguments, we ask the host to pose a question and ask the audience to indicate the opinions they brought into the studio. This vote is stored and after the advocates have completely presented their cases, we take a second vote."

"We display the results of the two votes to indicate the gross change such as, '10 more now vote for the affirmative,' but the character of the change."

"That is: '15 former nays now vote yes, and five former yeas now vote no.' And at the same time, if a certain question is displayed, the undecided vote was swayed," Trelegan explained.

Counting the vote and storing the data terminal by terminal is straight forward programming. There are also provisions for storing the results of a poll without the voter at each terminal. Such factors as political affiliation, race, religion, or anything that is pertinent to the question can be recorded.

# ACM, Other Interested Groups Plan Adjunct Meetings

**HOUSTON** — Scores of "adjunct meetings" will surround the main event next week, when the fall computer carnival gets under way at the Astrohall.

The participating groups include Federations of Information Processing Societies (Ahips), sponsor the conference itself, and several of the constituent societies hold annual, semiannual, or special meetings in the meantime.

The Association for Computing Machinery (ACM), generally considered as the senior U.S. society, will hold the largest meeting, running from Saturday through Friday.

The Special Interest Group on File Description and Translation (SigFidet) will conduct a workshop on data description, except Saturday and Sunday, 9 a.m. to 5 p.m. at Room 100.

Saturday, Room A in the Astrohall, the Special Interest Group on Computer Graphics (SigGraph), will hold a dinner meeting from 6:30-8:30 p.m.

## And Now We Join... in Progress

Other activities are listed below, with the exception of those listed for interest ACM purposes (editors of the group's various publications, or chapter chairmen). Some meetings with meals require prior arrangements, but are nonetheless listed for general information.

"All ACM meetings will be in the Marriott Motor Hotel unless otherwise indicated, and will be described as precedes the time. The phrase 'Special Interest' has been omitted in group/committee listings.

## Monday, Nov. 16

Computer Science Education (SigCSE), AstroWorld Ballroom, A, B, 8 a.m.-10 p.m.

Computer Graphics (SigGraph) workshop, lunch, A, B, C, E, 9 a.m.-5 p.m.

ACM Standards Committee, Rough Rider, 2-7 p.m.

Computer Systems Installation (SigCos), Audience participation encouraged. Business meeting, planning, d, 8-11 p.m.

## Tuesday, Nov. 17

Computers and Physically Handicapped (SigCaph), D, 7:30-10:30 p.m.

Computer Personnel Research (SigCar) review of accomplishments, open discussion, E, 8-11 p.m.

Programming Languages (SigPlan), B, 8 p.m.-midnight.

## Wednesday, Nov. 18

Business Data Processing (SigBdp) "Centralization/Decentralization Issue" Meeting, breakfast, D, 7:30-9:30 a.m.

Biomedical Computing (SigBio), E, 4-5 p.m.

Joint Users Group (Jug), Mustang, 4-8 p.m.

University Computing Center (SigUCC), Panel on resource allocations in university computing centers, S. Chapparal, 5-8 p.m.

Operating Systems (SigOps), B, 8-10 p.m.

Language Analysis and Studies in the Humanities (SigLash), Applications in archaeology and anthropology, C, 8-11 p.m.

Artificial Intelligence (SigArt), F, 8-11 p.m.

Computer Uses in Education (SigCae), Review of ACM '70 Convention, as regards increasing the role of computers in instruction. Panel discussion, S. Chapparal, 8-11 p.m.

Computers and Society (SigCas) (Jointly sponsored with IEEE and Ahips), All technical speakers have been invited to sit as a panel this session, E, 8 p.m.-midnight.

## Thursday, Nov. 19

SigBio, continued, F, 8-10 a.m.

SigBio, continued, Rough Rider, 1-3 p.m.

ACM Council, E, 8-11 p.m.

## Friday, Nov. 20

ACM Council, D, 9 a.m.-5 p.m.

## Systems, Other Societies

The Computer Group of the Institute of Electrical and Electronics Engineers also conducts meetings throughout the joint computer conferences, in addition to other regular get-togethers. The IEEE meetings will all be held at the Shamrock Hilton Hotel.

## Monday, Nov. 16

Peripheral Equipment (Technical Committee), 9:30 a.m.-5 p.m.

Fault Tolerant Computing (Technical Committee) Venetian, 8-11 p.m.

## Tuesday, Nov. 17

(All Meetings Sponsored by Technical Committee)

Computers and Communications, Castilian A, 8 a.m.-5 p.m.

Computer Elements, Castilian C, 8 a.m.-5 p.m.

Computer Architecture, Nile, 9 a.m.-noon.

## Wednesday, Nov. 18

(Mostly committee meetings, in preparation for the administrative meeting on Friday.) A 9 a.m.-5 p.m. business meeting.

Computer Group committees will meet in various rooms: conference and meetings, editorial, technical activities, and membership. At 2 p.m., the executive committee will meet, scheduled to ad-

dress the joint session at 10 p.m.

## Friday, Nov. 20

Administrative committee, meeting with luncheon, Belvedere, 9 a.m.-5 p.m.

In addition to the numerous meetings listed above, at least two other constituent groups will conduct business during the week.

The Society for Information Display will hold its Executive Committee Meeting at the AstroWorld Hotel Wednesday afternoon, and the board of directors meeting all day Thursday, "also at the AstroWorld."

Concluding the week's activities to Sat National SCI meeting, from 9 a.m. to 3 p.m. at the Shamrock Hilton Hotel. One panel will discuss "Trends in Simulation Computer Hardware," and a second will address the topic of "Trends in Simulations in the Public Interest." The meeting will include a luncheon.

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**The Measure Men.**

## Many Fine Restaurants on Houston Gastronomy Tour

**HOUSTON** — The nation's sixth largest city boasts the Manned Spacecraft Center, the "Astrodome," several cultural events, and scores of excellent dining places.

More than sixty member restaurants recommended by the Greater Houston Convention and Visitors Council, CW lists several which are located nearest the convention center. Comments by the American Automobile Association follow the general descriptions of restaurants.

The AstroWorld Inn on Kirby St., is the start of all Houston journeys for conference attendees. Heading North on Kirby, there are at least three hotels within sight, all with dining rooms.

As is the case with other restaurants, membership in the "private clubs of Houston" is necessary to partake of alcoholic beverages, where they are offered.

\* First is the *AstroWorld*, site of the keynote address. It features three distinct

dining facilities, with champagne dinners and gourmet food, plus a bar. Entertainment is provided in the supper club, the Dining Room, 11 a.m. to 11 p.m. Supper Club, 6 p.m. to midnight, to 1 a.m. Sat. Bar, 11:30 a.m. until midnight, until 1 a.m. Sat. (AAA: "Very good") 748-3221.

\* Holiday Inn-AstroWorld: *Rhubarb Club* features entertainment; *Rhubarb Club* features entertainment; *Dinner Room* open 6 a.m. to 7 p.m., 7 days (AAA: "Very good") 748-1050.

\* Sheraton Inn-AstroWorld - two

distinct dining facilities, featuring American and Continental cuisine, plus private club with "colorful Texas rodeo atmosphere."

\* *Sheraton Room* - vibrant Spanish decor, dinner and dinner.

\* *Conestoga Coffee Shop* - wide variety of food, open for breakfast, lunch (AAA:

"Very good") 748-3435.

\* *Conestoga Inn* - *North on Kirby St.*, there

is a Steak 'N' Shake at 1104 Old Spanish

Trail. This Old English Inn features the "cottage aged beef" served by costumed college students in a rustic atmosphere complete with fireplace, 665-7566. Open from 6:30-11 p.m. Sun.-Thurs., and until midnight Fri. and Sat.

\* Further North on Kirby St., on the corner of South Main, is one of two *El Chicano International* restaurants featuring foods of Italy, France, Mexico, and the U.S. The club advertises "popular prices" for dining, and also has a "Vaquero Club" which has dining and entertainment. Hours: 11 a.m.-midnight, until 1 a.m. Sat., 666-2284.

\* *AstroDome* - *South Main Street*, when one turns left from Main Street. Facing South, there are nine restaurants, some located in hotels, between here and the south loop of the Route 610 beltway.

\* First is *Kaphan's*, which calls itself the "aristocrat" of seafood and steaks. It features the *Charcoal Garden*, for dining, and *Club Kaphan's* for cocktails, and is

located at the corner of Kirby St. Closed Wednesdays, Kaphan's is open 11 to 11 on Sunday, and 11 a.m. to 11:30 p.m. other days. (AAA: "wide variety of very well prepared food...attractive dining area"), 668-0491.

### South on Main Street

\* *Sure House Motor Hotel* features the *Golden Horseshoe* private club, open from 4 p.m. until "curfew." (AAA: "Good"), 667-9261.

\* *Gusto's Restaurant* features seafood and steak, dress is casual, open for lunch 11:30 a.m.-2 p.m., dinner at 5 p.m. Closed Monday, 668-4444.

\* There are perhaps twenty *Dobb's House* snack bars open around the clock, and are spaced over the entire area. One is diagonally across the street from Gaido's. \* Back on the West side of South Main is the *White House* Motor Hotel and Restaurant, which offers "American cooking with Italian specialties on request." Hours: 6 a.m. to midnight, except until 10 p.m. Sundays, 666-2261.

\* *The Twenty-Nine Palms Coffee Shop* is in the motor hotel the same name and is open for breakfast only, plus sandwiches and soups until 2:30 p.m. Closed Sundays, 668-0691.

\* *Las Vegas Motor Hotel* features the *Fred Lot Restaurant* serving U.S. Choice, Steak and fresh seafood, hot lunches daily. Open: 6:30 a.m. to 10:30 p.m. seven days. The "private club" is closed at 2 a.m. and open again at 5 a.m. every day but Sunday, when it opens at noon.

\* *Remada-Domed Stadium* "Breakfast, luncheon and gourmet dinner" served in an Early American dining room. The private *Locker Room* has occasional entertainment. Hours: 6:30 a.m. to 9 p.m. (AAA: "Very good"), 666-4914.

\* In the "main circle" of the 610 is *Laurel Inn-Side Inn*, which hosts what being "home of the Knight on the White Charger." Prime and choice steaks, prime ribs, club facility. Lunch: 11:30 a.m. - 2 p.m. Mon.-Fri. Dinner: 5:15-11:30 p.m. (AAA: "Very popular...Old-English style"), 782-1520.

### Out of the Way?

\* For something a little out of the way, continue south on South Main, turn right on Stells St., then right again on Franklin where, on the corner of Milam Street, is the *Restaurant Bismarck* which includes the *Mosca Club*. Lunch 11:30-2:30, dinner 6:30-9:30, closed Sunday, 227-4168.

Continuing the tour, return to the corner of Kirby and S. Main, go to a Little North on Main, until S. Braswell St.

\* To the East (right) is the *Mariott*, which has the *Farfield Inn*, featuring in warm Spanish and Western decor, menu items open around the clock, seven days, and *Club Sylton* and *Saddle*, gourmet dining, dancing, live entertainment. 11 a.m. to 2 a.m., Mon.-Fri. 5 p.m.-2 a.m. Sat., and 5 p.m.-midnight Sunday. (AAA: "Excellent"), 747-2000.

\* To the left (West) on S. Braswell is the *Shoreline Hilton*, which dining in the *Pavilion Room* and *Charcoal Terrace*, cooking the pool, Texas-style steaks and diversified menu of delicious entrees. *Trader Vic's Restaurant & Private Club* features exotic Polynesian foods. Pavilion Room and Charcoal Terrace open for all three meals. *Trader Vic's* for lunch and dinner (AAA: "Very Good"), 747-2000.

\* Going East (right) on S. Braswell, just left of Fannin to find *Pier 21*, boasting the "world's finest seafood," including Maine lobster (home away from home for New Englanders), plus fine steaks and chicken. The Pier also "specializes" in gulf seafood, and dress is casual. Open: 11:30 a.m. to 11 p.m., except 10 p.m. Sunday, 747-5211.

Most of the "Western cut" steak houses are located in the downtown area and are not listed here.

## Some facts you must know before you choose an online savings and mortgage system.

You've made the decision. You and your management have decided to go *online*. You've decided to forego the expense, effort and headaches involved in developing your own system from scratch. Smart move! You'll save about \$275,000 by doing it this way.



Make another smart move! Spend a day with us in St. Louis reviewing the *U.S. St. Louis Online Savings and Mortgage Financial Package*. 54 leading banks, savings institutions and service centers have invested in the system because of its proven reliability. Since it was first installed in January, 1967, the *FDS* package has become the most widely used online system in the industry. Over 300 financial institutions in 22 states are now being serviced by our package.

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Multi-Drop Ability  
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Thirty-three highly skilled professionals provide the *FDS* "total support services" that include installation and training assistance, special modification service and continuing program and documentation maintenance. This unique staff is the key to our reputation for fine customer support and to future innovations that will keep the *FDS* system in its position of industry leadership.



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1,896 character display (27 lines of 74 characters each) on a 12-inch screen.  
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Quiet, solid-state keyboard in Teletype terminal format may be operated remotely.

## Inside Story of the Video Display Terminal that leaves all the others behind.



Switch-selectable full- or half-duplex operating modes.  
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Two-level video intensity. Useful for form filout. Computer-derived protected data is lower intensity; operator-entered data is brighter.  
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automatically at line 1, unless otherwise directed.  
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control. Including cursor positioning  
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High-speed, random-access core memory (3048 x 8) provides  
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3 remote monitors may be connected  
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The stalled printout on the left came from a computer trying to compute and handle a heavy print load at the same time.

On the right, the very same printout is handled off-line by DataPrint.<sup>™</sup>

An obvious improvement.

DataPrint can do the same for your growing print load. And for far less money than other so-

called solutions—like loading up your present system, or using a second-generation computer exclusively for printing.

DataPrint's computer is what makes the system so economical. It's small, easy to program, and designed only for output.

It accepts raw data from magnetic tape and disk. Formats, edits, and further processes it.

And drives the best printer you can get—the IBM 1403.

So let your main computer do what it was meant to do. Compute.

And handle your heavy print load with DataPrint. Our latest breakthrough.

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# International Epicurean Delights Houston Highlights

**HOUSTON** — The host city for the Fall Joint Computer Conference provides scores of interesting eating places, including several specializing in international food.

Following is a list of those members of the Convention and Visitors Council which offer such a bill of fare. The list is compiled alphabetically by country. Most restaurants also serve top quality American cuisine.

\* Argentine: Mama Puchos, 311 Travis (in Old Market Square), 224-4889.

\* Austrian: Restaurant Bismarck, 719 Franklin, at Main (in Old Market Square area), 227-4168.

\* Chinese: Timmy Chan Restaurant, 2606 Fannin, 226-0779.

\* Creole: Chez Orleans, 4088 Westheimer, 622-6747; Ravin Cajun, 1710 Richmond, 528-8553.

\* East Indian: The Safari Restaurant & Club, 4902 Richmond Ave., 621-4900.

\* English: Chesire Cheese Room in the Sheraton-Lincoln Hotel, 777 Polk Street, 224-9001; Lookout Side Restaurants, 6112 Westheimer, 782-5220, and 9810 Main St., 666-4181; White Horse Cellar, 1211 Fannin, 222-2319.

\* French: Brennan's, 3300 Smith & Stuart, 522-9711; Castille Restaurant & Club, 1617

Fannin - 9th floor, 224-1755; Foulands at the River Oaks, 3435 Westheimer (River Oaks apt. bldg.), 622-7891; Maxine's, 222-5100; Tony's, 802 Lamar, 227-9595; Tony's Restaurant & Club, 2617 Sage at Westheimer, 622-6778.

\* German: Restaurant Bismarck, 719 Franklin, at Main (in Old Market Square area), 227-4168.

\* Greek: Athens Bar & Grill, 8027 Clinton Drive - near Port of Houston, 675-1644; Parthenon Restaurant & Club, 611 Fannin, 227-8828.

\* International (general): Restaurant Cellini, corner of Stuart and Bell, 524-4007; Charley's, 517, 517 Louisiana, across from Alley Theatre and Jones Hall, 224-4438; El Chico International restaurants, 239 Sharpstown Center, 774-9889, and 7707 South Main, 666-2222; Los Tresos, 1516 Westheimer, 528-8684; Rib Room at the Hotel Sonesta, corner Smith & Jefferson, Culver Center, 227-6464.

\* Italian: Del Monaco Spaghetti House, 3925 Westheimer Road, 622-5553; Joe DiMaggio's, 3705 Richmond Ave., 234-2323; Tony's Restaurant & Club, 2617 Sage at Westheimer, 622-6778.

\* Japanese: Tokyo Gardens Restaurant, 4701 Westheimer, 622-7886.

\* Jewish: Alfred's, 9123 Stella Link, 528-6511; 2408 Rice Link, 528-2891; and 520 Town & Country - home of the Alpine Club, 464-5411.

\* Mexican: El Chico Restaurants, 239 Sharpstown Center, 774-9889, and 7707 South Main St., 666-2288; Molina's Mexico City Restaurant, 4006 Main,

528-8619; Rancho Alegre Resort Motel, Gulf Freeway at Dickinson-Alvin Exit, 1-534-2571.

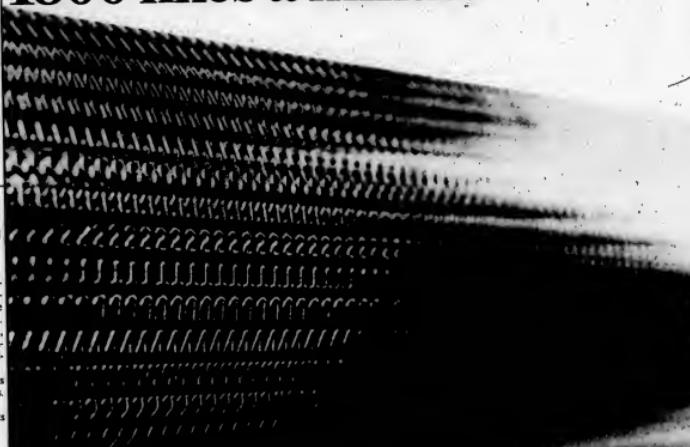
\* Middle Eastern: Phoenix Restaurant & Club, 4326 Richmond Ave., 622-6780.

\* Polish: Newlander Vic's Restaurant & Private Club, in the Shamrock Hilton Hotel, Main St. at Holcombe, 668-9211.

\* Spanish: Castillo Restaurant & Club, 1617 Fannin - 9th floor, 224-1755.

\* Swiss: Le Chalet Restaurant & Club, 511 South Post Oak Lane, 621-3333.

## New Drum Printer delivers 1800 lines a minute



### Afips Lists Fees And Registration Times for Joint

**HOUSTON** — Afips has announced the following registration fees and schedules for the Fall Joint Computer Conference.

Fees: Members of ACM, IEEE, SCI, SID and other constituent societies are \$20, including Conference Proceedings.

The charge for non-members is \$40, which includes Proceedings. Full-time students pay \$5.

Texas Barbecue/reception costs \$8; luncheon \$7.50.

#### Registration Schedule

Conference sites (Astrohall) — Mon., Nov. 16: 6 - 10 p.m.  
Tues., Nov. 17: 8 a.m. - 10 p.m.  
Wed., Nov. 18: 8 a.m. - 7 p.m.  
Thurs., Nov. 19: 8 a.m. - 5 p.m.

Hotel Registration sites (Holiday/Astroworld/Marriott, Rice, Shamrock Hilton):  
Mon., Nov. 16: 5 - 9 p.m.  
Tues., Nov. 17: 8 a.m. - noon

Houston Intercontinental Airport:  
Mon. Nov. 16: noon to 9 p.m.  
Tues., Nov. 17: 8 a.m. - noon

### Proceedings Copies Available to Those Not Attending FJCC

**MONTVALE, N.J.** — Persons unable to attend the Fall Joint Computer conference will be able to procure a copy of the Proceedings by sending the conference sponsors.

The cost to members of Afips' constituent societies is \$13 for the hard-bound printing of the technical papers. Nonmembers pay exactly double.

## You'll get delivery the first of the year.

**That's the real news. Quality EDP printing at this speed is certainly important. But actual delivery in just four months gives you the competitive edge now. The new 2470 Line Printer delivers up to 1800 lpm on a standard 132-column format. You'll get crisp straight printout because the 2470 is built around our exclusive one-piece Mark IV hammer. And it's built by the people who've perfected the drum printer. Simple design and conservative packaging mean over 1500 hours MTBF and one hour per month preventive**

**maintenance. Other features include up to 6 clear copies, and quality OCR printing at reduced speeds. The price is good news also. Less than \$13,000 in OEM quantities. You don't have to wait for others to catch up. Get delivery on the fastest drum printer on the market by calling our nearest sales office.**

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"See us at Booth #1014 FJCC."



# Digital Scientific



With our  
**90-nanosecond ROM**  
you will emulate  
the big ones bit by bit!

See us in Houston  
Booth 1527; FJCC—November 17, 18, 19

Our ROM is so fast that you can emulate *all* operations of a computer, including input/output operations.

If you have IBM 1130 or 1600 computer programs, then the META 4<sup>®</sup> can be used with microprogrammed emulations in ROM which allow it to *use your existing programs at greater speed and at less expense.*

With inexpensive ROM options, firmware floating-point capabilities perform many tens of times faster than other computers. META 4's capabilities are *not restricted to IBM 1130/1600 applications. Other computer instruction sets can be emulated.*

If your requirement is communications, ROM contents are tailored quickly and easily to allow the META 4 to handle your data communications job more efficiently than any other device.

If you need a special, fast, disc file controller, ROM programs operate the file, do address and data format conversion; and interface to your data processing system—all at low cost and high speed.

The Digital Scientific META 4 saves time while doing all of the things it does best for you . . . solving your problems.

META 4 is a flexible, logic processor controlled by its Read-Only Memory (ROM) so that you can make it into:

- a computer ■ a communications controller
- an FFT processor ■ ■ COBOL or ALGOL machine
- or a FORTRAN engine.

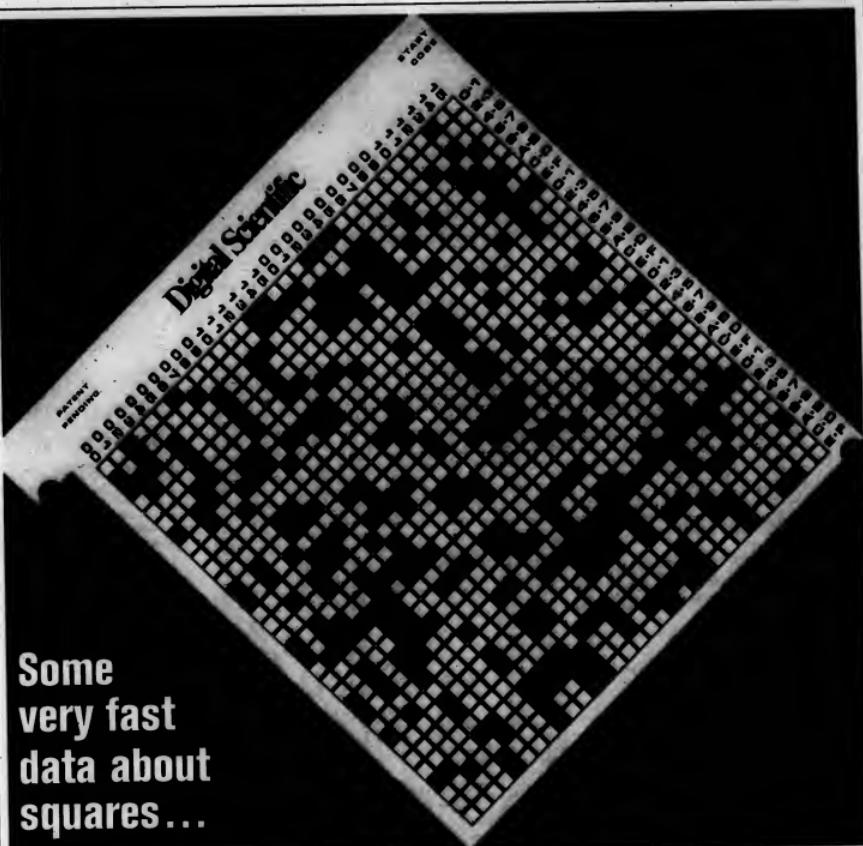
ROM firmware is custom tailored to turn META 4 into all of the things it does not, at first glance, appear to be. Firmware is the control memory program that executes at *less than 90 nanoseconds per step*. Microprogrammed firmware isn't unique, but the way it is handled in META 4 is. META 4 control memory contents can be modified to suit your microprogram—modified by *you at your desk* if you can't wait for us.

META 4 will process your special instruction sets. META 4 will process other computers' instruction sets. META 4 becomes the tool *you want it to be*—and META 4 is FAST!

\*META 4, Trade Mark

Offices Coast to Coast  
**DIGITAL SCIENTIFIC CORPORATION**  
11455 Sorrento Valley Road, San Diego, California 92121  
Telephone (714) 453-6050

## Digital Scientific



## Some very fast data about squares...

The above illustration is a pattern board from our high-speed (35-nanosecond access) Read-Only Memory (ROM) that controls the Digital Scientific META 4® Computer System. ■ ROM contains thirty-two 32-bit Instructions in a very powerful format.

\* Trade Mark

You microprogram this ROM like software ... and, with Digital Scientific's assembler and simulator, debug your codes. ■ The final pass of the assembler generates a ROM pattern; then, pattern boards can be prepared by us or by you at your facility. ■ Best of all, you can alter code and make changes, easily and simply, also at your facility.

The "big boys" have used "micrologic," but they cannot make this feature available to you ... depriving you of a valuable new applications tool for your data processing system.

This capability, plus a flexible off-the-shelf group of hardware components, makes it possible for Digital Scientific to do a microprogrammed emulation of another computer (such as the IBM 1130/1600 to date), META 4 can be a high-speed peripheral controller or it can do communications (either as a replacement for the IBM 2703 or as a full-scala front-end communications system). ■ META 4 can also be a complete stand-alone data processing system. It will fit the architecture and the specific application.

■ Up to 4,096 16-bit words ROM (35-nanosecond access) ■ up to 31 16-bit directly addressable registers ■ up to 256 16-bit words of scratch-pad ■ up to 65,536 16-bit words of 900-nanosecond core memory per memory I/O register ■ up to 8 8,192-word banks per memory I/O register with 4 ports per bank ■ real-time clock ■ storage protect ■ stall alarm ■ firmware floating-point with a 14-microsecond multiply of 32-bit numbers.

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# FJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCF

## Inforex Adds 3 Features To Key Entry

BURLINGTON, Mass. — Inforex will introduce three optional features to its Intelligent Key Entry System. A line printer and communications capability have been added along with an expanded tape processing ability.

The expanded tape processing allows tape search, update, proofing, as well as input to disk that were not previously possible with the key-to-tape system. Disk to disk blocking and unblocking and program control transfer by tape can also be accomplished.

The communications feature will provide two new operational capabilities, teleprocessing, and multistystem processing.

The multistystem permits tape to tape data transfer over telephone lines using standard modems.

The multistystem processing allows the linking together of up to eight key entry systems, allowing up to 63 operators to be

## Terminals Added To AMP Family

HARRISBURG, Pa. — A multiplexer, billing terminal, and hospital input terminal are three additions to the AMP family of data entry devices being introduced.

Designed for time-sharing 16 input terminals, the multiplexer records input data on 7- or 9-level computer compatible tape and includes full field check and error answerback capabilities, AMP said.

The billing terminal collects data on 9-level cassette tape from credit card, variable data, and fixed data sources. A built-in imprinter provides for audit trail.

Entry of all hospital charges and audit trail capabilities are features of the hospital input terminal.

Other data entry devices on display by AMP are: magnetic card readers, job cost recording terminal, inquiry terminal, data accumulator, credit validation terminal, and terminal components.

AMP will be at booth 1311.

## Litton to Show 30 OEM Products

CARLSTADT, N.J. — Litton ABS expects to show at least 30 pin-sensing, badge, optical, reflective, key sort, mark sensing, brush and magnetic stripe card readers at FJCCF.

These include an expansion of the Litton product lines, formerly confined to punched paper tape, tape and edge punched card punches and readers, and a serial printer.

Several new punches will also be shown at booth 1401, the company said.



Being offered with the Inforex Intelligent Key Entry System are three new optional features: expanded tape processing, communications, and a printer.

managed by one supervisor.

The supervisor used to print selected files from either tape or disk, is many as eight systems when the multi-system processing feature is also installed, Inforex said.

Inforex will be at FJCCF booth 3017.

many as eight systems when the multi-system processing feature is also installed, Inforex said.

Inforex will be at FJCCF booth 3017.

## Data 100 Exhibit Includes Model 78 Programmed Unit

MINNEAPOLIS, Minn. — Data 100 Corp. plans to demonstrate its line of terminals, including its Model 78 Programmed Terminal.

The Model 78 will initially be available in two versions: compatible with IBM 2780 installations, and the Model 78-2, which is designed for plug compatibility with IBM 360/20 terminal systems. The unit to be shown will be on line.

The original member of the company's line of Seventy Series terminals, the Model 70-1, will be used for demonstrations of

the capabilities of the batch terminal system.

The terminal consists of a control console, card reader input device, and line printer output and is designed as a plug-in replacement for IBM 2780 units.

Also on exhibit will be the Model 73, a desktop CRT display unit which is plug interchangeable with Model 33 and 35 Teletypes. The Model 73 features a three-section keyboard, buffer storage and hard-copy capability.

Data 100 will be in booths 1519, 1521, and 1523.



Are we ever in OCR? with the complete range of input units, from basic to highly sophisticated machines. All expressly engineered for the requirements of trouble-free OCR input. All standard fonts. Addo-X service. Addo-X's proven reliability, of course. And every machine with the feather-touch 10-key symmetrical Addo-X keyboard which has become the favorite

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**JCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJ  
Tracor Exhibits T/S System, Operating Computer**

AUSTIN, Texas - Tracor Data Systems (TDS) and three affiliates plan to exhibit specialized computer systems and a variety of peripheral equipment. TDS said its exhibit will in-

clude an operating TDS-1255 computer, a small, time-sharing system capable of handling 16 remote time-sharing terminals simultaneously while processing in a batch mode; and nine

TDS-1601 conversational terminals, that are plug-to-plug compatible with Teletype machines.

and line interface

Francisco, will show its 1700 series tape units. The 1701 writes incrementally to 1,000 step/sec and above, and both the 1701 and 1702 read and write synchronously from four in/sec to 37.5 in/sec, in IBM 360 formats of .7-, or 9-tracks at 556 bit/sec or 800 bit/sec, respectively.

Tracor Data Systems and affiliates will occupy booth 2003.



TDS-1255 System

# **"Why we're offering you a new source for exchange data terminals."**

ZV Zakarian, President Western Union Data Services Company



When you lease or buy Model 33 exchange data terminals, you're looking for a great deal more than hardware. But we both know you don't always get it.

That's why Western Union Data Services Company provides the nationwide servicing, applications engineering training and support you need along with every data terminal we install.

As a new company that grew out of many years of communications systems experience, service is the heart of our business. Looking for more than hardware? We can help you.

For example, we can offer immediate delivery of Model 33 terminals for as low as \$50 a month, plus the

help you'll need in the months to come. By the way, we can supply the Model 33 in three configurations permitting access to the telephone network via (1) Data-Phone (2) Data Access Arrangements or (3) Acoustic coupler to standard telephone.

Contact me at Western Union Data Services Company, 16 McKee Drive, Mahwah, New Jersey, 07430. Phone: 201-529-4600. Telex: 12-5077.

**Western Union  
Data Services Company.**

See us at FJCC, booth 1334.



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Start with the Capital model CAM-360-0 Channel Access Module (for only \$1935) and build your own device controller, or let us build a complete control unit to your specifications. For more information, write or call.

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What's your million-dollar memory doing in the meantime? Waiting... expectantly.

In this business, one missing bit can ruin a reputation. That's why there's no such thing as a "little" dropout.

Handling damage causes most dropouts. But now Graham Magnetics has a tape



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permanent magnetic tape

tough enough to resist this kind of damage.  
*A tape 80 times tougher than anything the competition has to offer.*

We named our new baby Epoch 4. And started it out in life with a 20-year warranty. Because it's really that good.

Look around. Is one of your transports in a retry cycle right now? Or erasing when it could be writing?

You could be a "little" bit pregnant, and not even know it. Maybe you'd better make an appointment with the man from Graham Magnetics.

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# What others claim, we do.



Ampex Extended Core Memory is busy at more than a dozen operating sites, doubling or tripling IBM 360 throughput. We're the only ones actually doing it on-line.

Our ECM has proved itself at such installations as universities, computer time-share services, a medical service center, governmental agencies and a number of major corporate EDP centers.

Ampex ECM at one university, using 360/65 Computer, has increased its computing speed 3.5 times over operation with the IBM 2361 LCS. Another user confirms that with the 360/50, Ampex ECM runs at 1.8 times the main core, far outstripping the LCS unit.

Our ECM has a cycle time of 4 or 2.8 microseconds, depending on the computer, expandable from 1 to 8 million bytes. It's a direct plug-in system to replace the IBM LCS with no software changes.

You can lease or buy, get direct Ampex installation and service from a worldwide organization of factory-trained personnel.

Call your Ampex representative for a list of operating sites. One call will be the ultimate guide to increasing your computer time efficiency. And you can ask about IBM plug interchangeable tape drives and other computer products from Ampex, the leader in computer peripherals—available individually or on an OEM basis. Call Ampex, (213) 836-5000, or write Computer Products Division, 9937 West Jefferson Boulevard, Culver City, California 90230.

Your computer counts on us.

**AMPEX**

Visit Ampex at FJCC Booth 3013

# JCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJCCFJ

## ICP to Show Tape Drive, Keycette

DALLAS — International Computer Products, Inc. (ICP) is planning to show the Keycette digital recording system and the ICP incremental tape drive.

The Keycette uses a parallel buffer memory with incremental characteristics.

Data is stored on magnetic tape contained in standard compact cassettes with up to 700 101-character blocks recorded on a tape cassette.

In the record mode, data from the input device is coupled to the basic Keycette system by interface boards designed specifically for that input device. Two forms of editing have been programmed.

The incremental tape drive is a general purpose character oriented deck that can read and write characters on an incremental basis at rates up to 30 char/sec.

In addition, continuous opera-



ICP Keycette



ICP Tape Deck

tion is allowed at higher rates, the company said. The deck is bidirectional in the read mode.

Individual characters can be recorded, the backspace and correct operations are permitted.

The company will be at booth 1512-16.

## HP Display Includes 2116C, 2114C Systems

PALO ALTO, Calif. — Hewlett-Packard will be demonstrating computer and systems peripherals at booth 3002.

Two computer models, the 2116C and 2114C are 16-bit machines which have a new HP-developed folded-planar core memory that takes less space and costs less than previous memories, the company said.

The systems to be featured include a low-cost disk operating system for batch processing and the 2116C's 2000C time-sharing system. Both systems have expanded data storage capability with moving-head disk memories.

Among the peripherals in the

HP booth will be a graphic plotter, Model 7201A, which operates in conjunction with an IBM communications terminal and develops graphics by drawing vectors or plotting points.

The Model 7970A digital tape drive, a low-cost, IBM-com-

patible unit, for OEM use will also be displayed.

The unit operates at tape speeds up to 45 in./sec, and is available in 7- or 9-track configurations, or with 7 and 9 track in a read/read configuration.



HP 2000C Time-Sharing System

## Sure, the Sycor 340 data communication system gives you clean source data capture.



### Sycor 340

The one-terminal terminal that does it all. Heart of the Sycor System.

Trim. Tasteful. Yet figuratively bulging with the newest of proven, mass-produced modular microprocessor technology. All of which makes it easy to learn and use that any regular office guy or gal takes to it quickly and can achieve high productivity without knowing a thing about data processing.

Entry by electronic keyboard onto magnetic tape or magnetic disk data

to be recorded about 30 per cent faster than it would be electromechanically. Sycor 340's unique automatic paging option handles even long or complicated forms by accepting them in small segments, of pages, easily scanned. Then it automatically displays page after page of labels and field control characters, easy for the operator to follow. And (hallelujah!) you can't, no, you can't mess with. Just complete the job in half the equivalent of 1400 punch cards.

Easy to load and to store. Thrifly re-punch cards.

You can interface the 340 with the Sycor printer and get all the versatility of high priced line printers. Use multiplex, continuous, pre-printed forms for a host of applications.

Like order forms. Remote invoicing. Remote payroll checks. Whatever.

Two 10-digit accumulators—  
a Sycor first, by the way—generate totals or subtotals  
detecting key errors in data  
keying and verifying data. Other error detection features  
include visual proof-  
reading from the CRT, programmed entry, format field and character checking, and check digit verification. Add and subtract operations give you automatic total and subtotal field computation and entry without re-keying on an adding machine. Result? Clean, tape output—at the data source—that cuts delays and confusion, dramatically lowers mainframe processing costs.

### But data capture is only a part of what you really want a terminal system to do for you, isn't it?

Sycor's modular system can be configured for batch communication, via the voice-grade public telephone network, for attended or lower-cost unattended operation. Sycor's binary synchronous procedures, with automatic retransmission that provides automatic error detection, and speeds of 1200, 2000 and 2400 baud, are compatible with S/360 hardware and software.

You can set up an off-line system that gives you the advantages, but none of the complexities, of teleprocessing, by using the Sycor 510 Communication Converter Station at your central office to record on, or transmit from, commercially compatible magnetic tape.

That's another part, right?

Talk to Sycor.

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## Airooyal to Show Monitor Unit, Energy System

**FAIRFIELD, N.J.** — Two products will be shown at the Airooyal Manufacturing Co.-booth.

A new, high-speed monitor system is designed to give the attitude, temperature, three power supply feeding the computer room. Response time of the unit is two msec.

Also being shown is the Airooyal Continuous Energy system that can supply, the company said, uninterruptible power for critical computer applications.



Airooyal Monitor System

The company will assume responsibility for the total package of design, installation and maintenance of the system, on a lease basis.

The company will be at booth 2315.

## Time-Zero Communications System Usable As Front-End or Remote Concentrator

**TORRANCE, Calif.** — Time-Zero Corp. intends to demonstrate its digital communications systems, the DCC-90, which can be used as a front-end processor or remote programmable concentrator.

The company said that the unit will be operating as a remote concentrator on line to a Burroughs 5500.

The system features synchronous and asynchronous communications with ranges of 2,000 to 50,000 baud and 40 baud to 9,600 baud respectively. The system may operate in either half- or full-duplex.

The DCC-90 recognizes asynchronous terminals as they are connected. It is said to be capable of translating 5-, 6-, 7-, and 8-level codes to a common machine code or of emulating mainframe manufacturers' facilities with host computers.

Line adapter units are incrementally added to the system, as required, to a maximum of 256 lines.

Direct interfaces are provided for disk memory systems, line printers, card reader/punches, and most standard peripheral devices.

Software elements provided include operating system, on-line diagnostic system, and utility programs for custom-installation programming.

An average system with 75 lines costs at \$80,000. Incremental line costs range from \$300 to \$700.

Time-Zero Corp. will be in booths 230 and 1232.

## Strip Printer Weighs One lb.

**WOODLAND HILLS, Calif.** — A terminal, serial memory, and strip printer will be introduced by the Systems Division of Electro-Data Systems, Inc.

The CT-100 computer terminal can be plugged in directly to existing computer systems servicing teletypewriters, and requires no special modems or voice response equipment, according to the company.

The unit features a 12-push-button keyboard, a reader for plastic punched cards, a strip printer and an acoustic coupler. Optional devices included a 54-key block alphanumeric keyboard, a 55-key full ASCII keyboard, and a cassette tape recorder.

Called the Mensor 100, the new serial memory is a 1,024 by 8 or 9-bit high-speed system designed specifically for sequential memory applications, and has a se-



CT-100 Terminal

quential access time of 0.3 msec. Mensor 100 also can be used as a non-synchronous, random access, read/write memory in system applications where a relatively slow access time is acceptable.

Weighing only one pound, the pocket-size ESP 150 strip printer is an alphanumeric unit complete with character generation and decoding electronics which accept input information in either bit parallel or bit serial form.

The ESP 150 can print a full complement of 63 characters, plus blanks, at a rate of .50 char/sec., the company said. Logic and stylus driver power supplies also are available as options.

Electronics Arrays will be in booth 1427.

## Computer Complex To Exhibit T/S Net

**HOUSTON** — Computer Complex Inc. plans to exhibit and demonstrate both its time-sharing network and communications equipment.

The Complex exhibit in booths 3230-32 will feature program demonstration in several specialized fields, including well drilling optimization and numeric control of machine tools.

# Bound-up in EDP problems?



**Successful EDP management** depends upon getting the right computing power to the right place, at the right time, at the right price — in spite of problems!

So, how do you untie knotty problems like peak-loading jam-ups or extend computing service to remote locations that can't justify their own computers? And, what happens when your computer is down or not right for the job?

More computers aren't the answer. That's old hat — and expensive. It's better to extend the computing power you have or, get access to more when you need it. How? Simple. Use intelligent data terminals to act as computer extenders. Where you need them. For a slice of the computing power you want, in-house or outside. Dial-up or dedicated.

And, that's where DTS-100 comes in. It's the "intelligent" remote batch data processing terminal. It's programmable for ready access to the computer you need — when you need it. That's the job it does. It talks with other terminals, too. It also works stand-alone for off-line data preprocessing and formatting in a complete data processing package. Consider this, too. DTS-100 is simple to

use. Operator program loading selects the program for the computer of your choice. You merely dial-up and get on-line. It's flexible, too. Change or add peripherals as your needs change.

The basic DTS-100 terminal includes its own mini-computer, program communication protocols and compress data. Its own I/O processor controls the peripherals and data set interface. And, its peripherals offer the right functional combination for the speed ranges you need: Card readers read at 400 or 600 cpm. Line printers print at 300 or 1000 lpm. Card punches punch at 100 cpm.

Magnetic tape units — 25 ips or 100 cpm — transports intermixed — are IBM compatible. CRT's, too.

One more thing before you go.

We'd like to tell you more about DTS-100. Write for our Bulletin 1035. Or call us. Remember you can use DTS-100 even if you don't have your own computer but need computing power. It's called time sharing. Besides, it costs a lot less to use. You'll like that.



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See DTS 100 at FJCC

Booths 1233 & 1235.

# Here are the reasons why over 130 companies have already selected Novar

On every count—human engineering, electro-mechanical engineering, system flexibility, expandability, reliability, styling, field service coverage, and price—Novar stands head and shoulders above all others. And we're sure you'll find an A-B comparison will bear this out.

Here then are summary descriptions, and facts, about Novar's terminals and auxiliary devices you may wish to consider when planning or expanding your telecommunication system.



The NOVAR 5-50 Business Data Communication Terminal prepares hard copies of business papers and tape cartridges for computer processing. Data can go on-line, or can be batch entered from tape directly into the computer via telephone lines. Variable transmission rates available up to 2400 bits per second, \$6,715 when purchased, \$195 per month rented, including service.



The NOVAR 5-41 Conversational Terminal is portable, weighing less than 50 pounds. Operates on-line with all third generation computers that are compatible with 2741 type dascas. Features a unique two-character buffer that prevents the printer from falling behind the computer when receiving data. \$4,500 when purchased, \$115 per month rented, including service. Portable carrying case also available.



The NOVAR 5-51 System, with multiple tape units, performs the functions of computer entry, error-free paper typing, automatic typing, teleprocessing, and has the capability for high-speed intraoffice terminal-to-terminal communications. When used with Administrative Terminal Systems, the 5-51 provides for editing, insertions, corrections, re-ordering of data and automatic justification. \$6,155 when purchased, \$235 per month rented, including service.



The NOVAR Ten-Key Numeric Input expands the capability of any Novar buffered terminal to include bookkeeping, accounting, engineering, scientific and other numeric functions. Terminals can be ordered equipped with the 5-02, or the unit can be added at any later time by attaching it to the built-in socket that is a standard feature on these terminals. \$490 when purchased, \$15 per month rented, including service.



NOVAR'S Expanding Product Line now includes auxiliary plug-in magnetic tape units, proprietary digital tape cartridges, various built-in modems, an acoustic coupler and terminal desks.

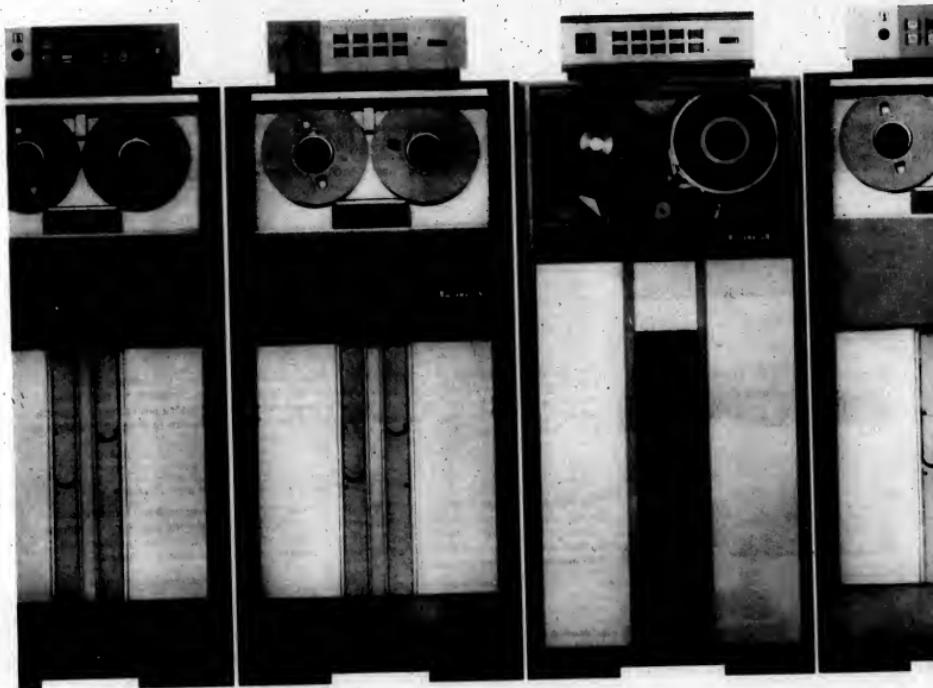
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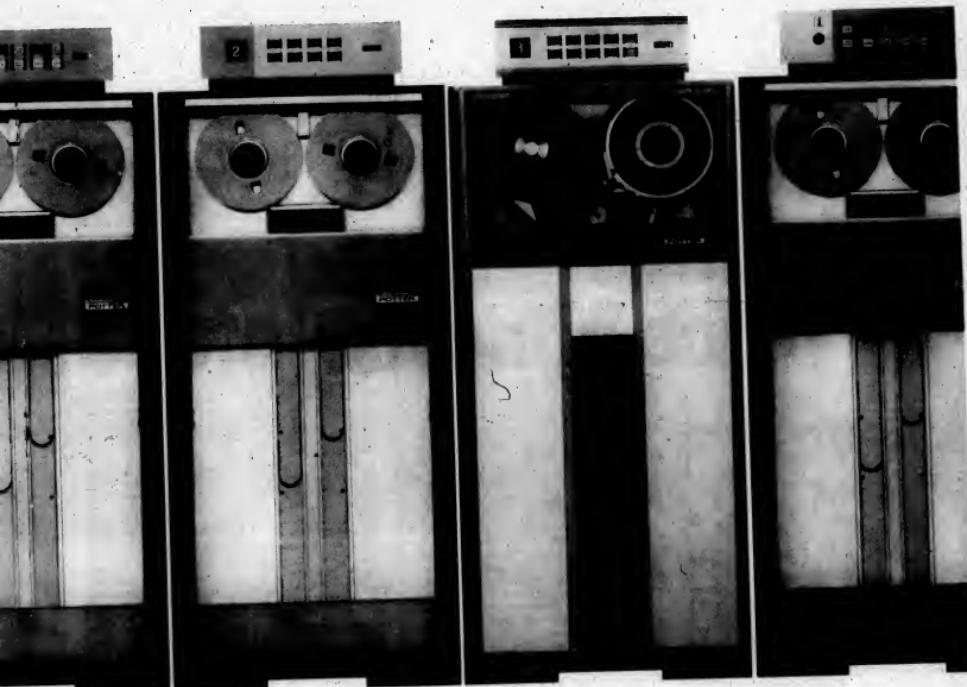


All 15 models of Potter's "plug-to-plug" Magnetic Tape Unit line are now supplied with our new Hard Coat recording head. The result is a series of tape units which can operate on IBM systems for over 2000 hours without adjustment for wear. This HARDWARE RELIABILITY insures you of better system reliability —

less down-time.

Then there's Potter's DATA RELIABILITY that assures you error-free output. Such things as single capstan drive, retractable read/write heads and automatic threading all work toward eliminating date drop-outs and errors.

# ONLY PART OF THE DRIVE STORY.... TRIPLE RELIABILITY.



Finally, there's SERVICE RELIABILITY. Potter maintains a nation-wide staff of trained field engineers to give you fast, dependable service...to keep your down-time to an absolute minimum...to keep your jobs on schedule.

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IBM systems than any other independent make. For tape drives, disk drives or data terminals, call Potter first.  
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Potter. A lot more than less expensive.

## Hardwired Multiplexers Require No Programming

STAMFORD, Conn. — On-Line Computer Corp. plans to show a Variable Time Division Multiplexer (VTDM).

The unit is said to include the best features of multiplexers and concentrators in hardwired form. It requires no programming.

On-Line said that the unit pro-

vides efficient line utilization and full computer port contention, through a cross-mapping option. It also includes a universal line adapter.

Use of the VTDM is transparent to the terminal user, according to the company.

On-Line Computer Corp. will be at booth 3709.



On Line Multiplexer

## Two Data Security Units Scheduled by Datotek, Inc.

DALLAS — Two electronic security systems for the encoding and decoding of digital data are scheduled to be shown by Datotek, Inc.

Both provide the user with total selectivity and control over four trillion possible code formats, the company said. The systems are said to render coded

digital data useless to anyone not having access to the equipment and the proper code sequence.

The DC-108 Datocoder is designed for off-line encoding and decoding of point-to-point communications, the company said.

The DC-110 Datocoder is designed for on-line time-sharing applications where communication is between remote terminals and the central site computer and data processing center.

The DC-110 system is operational over standard telephone-data lines, dedicated lines, and microwave links at data rates up to 100,000 bit/sec, Datotek said.

The company will be at FJCC booth 2229.



Datotek Datacoder

## Minis, Memories To Highlight CAI Exhibit

NEXTWEEK BEACH, Calif. — Two minicomputers will be shown by Computer Automation, Inc. (CAI).

The 1.6 usec machines are the Model 100 and Model 116, both of which use memories recently announced by CAI.

The company also will show other CAI minicomputers — models 808, 208, and 216, all of which operate at 8 usec.

CAI plans to demonstrate its new CAI Logic Computer Controlled Logic Tester and to show representative models of its new line of high-speed memories.

CAI's line of mainframe memory features read-only memories, scratch pads and both large and small core read/write



CAI Logic Tester

memories offering economy, high speed and building block flexibility, CAI said.

Included are 1K, 2K and 4K core memories that can be mixed with 128-word and 256-word scratch pad memories.

Computer Automation's display will be in booths 3615, 3616, and 3618.

# Full tape protection in a one-piece container for the price of seals.

**That's New Tab Reelgard Exclusive Reelgard**  
one-piece construction assures the ultimate in safe magnetic tape storage, even if you are using open aperture reels. The hinges, hanging hook and positive Reelgard locking system are molded into a thin  $\frac{3}{16}$ " high-impact, shatter-proof polystyrene case. Reelgard keeps magnetic tape reels from resting on their edges, to prevent possible damage to the tape and to eliminate the danger of dropouts, with a molded-in support. When the Reelgard container is open, the design of the container permits grasping the reel by the hub for safe, proper removal of tape. A very tight, positive tongue and groove fit holds the reel securely. The Reelgard snap-latch opens easily with a snap of the fingers. There's no more fighting fit and suction as in old fashioned two-piece tape cases. When it comes to saving you precious magnetic tape space, Reelgard benefits you even further. Compared to conventional two-piece canisters, Tab Reelgard containers can accommodate 60% more magnetic tape in the same space, for half the cost! Whether you are hanging magnetic tape or storing it on shelves, Reelgard combines with proven Tab magnetic tape storage systems to help you store more, safer, in less space. With Tab Spacelander tape storage systems, new hanging racks are available for Reelgard in either 30" or 42" wide assemblies. If you want closed cabinet storage for your tape, new hanging Reelgard racks or conventional wire racks can be used in Tab Data Media Cabinets. For complete information about new Tab Reelgard tape containers, call your local Tab Products representative. Snap to it!

Unit Spacelander tape storage systems, new hanging racks are available for Reelgard in either 30" or 42" wide assemblies. If you want closed cabinet storage for your tape, new hanging Reelgard racks or conventional wire racks can be used in Tab Data Media Cabinets. For complete information about new Tab Reelgard tape containers, call your local Tab Products representative. Snap to it!

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## Data Modem, Multiplexer Perform for Codex Corp.

WATERTOWN, Mass. — Codex Corp. will exhibit the Codex 4800 data modem and the Codex 800 time division multiplexer.

The Codex 4800 data modem operates at 4,800 bits/sec.

The performance of the Codex 4800 is attributed to a unique modulation technique combined with a completely automatic and

adaptive digital equalizer.

Communication channel abnormalities are effectively neutralized to provide the widest range of compatibility in standard and substandard telephone channels, according to the company. The modem costs \$5,575.

The Codex 800 family of asynchronous time division multiplexers upgrade existing communications systems employing older frequency division multiplexers (FDM), TDM, and digital concentrator techniques. The 800 allows the user to buy only the modules required for his



Codex Multiplexer

immediate 50 bifice to 1,800 bifice requirements. Expanded requirements involve plugging in additional channel modules or eight channel expansion groups. Prices start at \$2,000.

Both the Codex 800 and the Codex 4800 are said to have complete network fault isolation capability.

Codex will exhibit at booth 3630.

## Hi-Tek's A/D Converter Has Self-Test Feature

SANTA ANA, Calif. — Hi-Tek Corp. expects to show its Model 737 analog to digital converter with 16-bit resolution at 150K word/sec. The unit has a self-test feature and incandescent display.

Other versions are available with 12.5 bits and reduced speed (50 kbs).

Prices range from \$3,950 to \$5,950 for high-speed units and \$2,950 to \$4,450 for reduced speed units, and delivery time is four to five weeks.

Hi-Tek will be at booth 2335.



Hi-Tek A/D Converter

## SAC Will Show Graf-Pen Unit

SOUTHPORT, Conn. — Science Accessories Corp. (SAC) said it will be showing the Graf/Pen digitizing data gathering device, consisting of tablet, stylus and control unit.

The tablet has an active area 14 in. square and is supplied with interchangeable frosted and clear plates.

The stylus combines a ball-point pen with a tiny speaker gap to generate a sound pulse which is picked up by strip sensors or microphones, along two sides of the tablet.

SAC noted that the basic configuration can be expanded to include a storage CRT or X-Y recorder for local display of the images being developed.

The control unit interprets information from the sensors indicating the position of the stylus on the X-Y grid of the tablet. SAC said that the unit is able to disregard all irrelevant noises picked up by the sensors.

The data bus from control unit into the CPU uses standard TTL levels, a company spokesman added.

Scientific Accessories Corp. will be in booth 2713.

## A-M Plans Many Displays

CLEVELAND — The Addressograph Multigraph (A-M) exhibit will include a computer entry system, an optical code and mark read scanner, a copy duplicator, and a continuous copy system.

The Series 600 Computer Entry System features an on-line computer entry capability that provides data transfer without tape reel handling. The system consists of an electronic memory and control unit which is time-shared by keyboard data entry.

The Model 9639 scanner is an optical code and mark reader interfaced to an IBM 029 keypunch. It is designed for the conversion of pencil mark and bar code data to punched cards.

The AMCO Copy-Duplicator can produce copies from a variety of originals at a rate of 90/min. Copies can be made on ordinary 16-lb to 20-lb paper, the company said.

The A-M continuous Total Copy System combines the capabilities of an electrostatic printer and an automatic duplicator with speeds up to 150 copies per minute on ordinary paper. The machine copies nearly any type of original, the company said, including difficult codes, solids, pictures, or even worn drawings.

Addressograph Multigraph will be at booth 1016.

DICK  
SEE JANE AT THE ATM  
SEE JANE ENTER DATA  
SEE JANE SEE THE DATA  
SEE JANE SMILE  
SEE THE BOSS  
SEE JANE SAY BOSS  
SEE THE BOSS SMILE  
SEE THE BOSS HAVING FUN  
SEE THE BOSS TO THE OTHER  
END BYE DICK

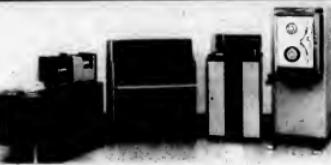


## **Atron Shows Datamanager Terminal Unit**

**ST. PAUL**, Minn. — Atron Corp. plans to show a family of programmable Datamanager Remote Terminal Systems.

The systems include: a 2780 System Program Package (IBM 2780 Emulator); 8K bytes of memory; full macro-instruction set, including decimal arithmetic and sequential editing sets of instructions; a 400 card/min card reader; a 300 line/min chain printer; and a 25-in./sec 9-track magnetic tape unit.

Atron said the terminals are compatible with the IBM 360 and 370, and other manufac-



## Datamanager Terminal System

turer's computers; and are designed to handle data in strings as well as single characters. The company said the user can now operate on volumes of data with each instruction. Utility routines for a full range of peripheral devices and a Report Program Generator (RPG) fill out the software required for local pro-

Atron Corp. is at booths 1620, 1622, and 1624.

## **CalComp Presents Multiple Products at Its Exhibits**

**ANAHEIM, Calif.** — CalComp is showing its high-speed drum plotting system, the 900/1136, the 900/1670 COM system, the precision 900/745 flatbed system and its new IBM compatible disk memory systems.

All the graphic systems utilize the Model 900 Controller - CalComp's minicomputer - which is designed for use with electronic and electromechanical digital plotting systems.

The Model 1136 Drum Plotter is said to be larger and faster than any drum plotter now on the market.

Microfilm System is faster and more accurate than any system CalComp has built previously, and compares favorably with any units on the market, the company said.

bed Photter is expected to be the industry standard for high accuracy and repeatability with speeds fast enough to satisfy almost all users, according to CalComp's Direct Access Disk Memory System features plug compatibility and interchangeability with IBM units. They provide low cost per bit of data, fast access, and high reliability.

## **Versatec Hits With Printers**

CUPERTINO, Calif. - Versatec will offer electrostatic printers with top-of-the-page formatting on fan-fold paper.

Top of paper-formatting is said to increase the effective operating speed of the Versatec Matrix 300 printer by providing rapid paper advancement at the end of text. In addition, the capability enables Matrix printers to produce standard 8-1/2 in. by 11 in. formatted pages.

The Matrix 300 prints at 30 line/min. and has over 3 in./sec. slew speed. Ascii inputs are decoded to 5 by 7 matrix characters by a 64 character set read-only memory.

The Matrix Series are designed for use with mini- and midicomputers, CRT display terminals, and high-speed communication lines. Versatec said it has interfaces for most popular computers and CRT terminals.



Versatec Printers

and verify data using our GTU-1. This means, of course, that the unit can pay for itself in payroll savings alone in very short order.

The machine uses easy-to-handle cassettes, one for programming and the other for recording output data, and its small brain contains a limited but capable memory system. Data can be fed in through the keyboard, the cassette, or telephone lines and output goes to the second cassette, the video display screen, or a typewriter for hard copy printout. The terminal will also split everything it knows to a computer, either over the phone or through our translator. One of the major virtues of the GTJ-1 is that it is engineered for people.

The major virtue of the G-10 is that it's designed to let people compact, comfortable, dead silent, and can work within a whisper of its information source. All entries are immediately visible for spot checking, and the machine can be programmed so that it's just a matter of filling in the blanks on the screen.

Verification is either visual or by simple re-entry, and the unit will light up, lock up, and say "ding" at any errors. Our terminal holds no touchy, unfriendly electronics. It's a tough, fast, accurate, and as foolproof as we could make it. And it contains the most useful and logical set of functions we could devise in a solid two years of designing, building, and testing. It is home being delivered. For details, drop us a line, or give us a call at (312) 867-4200.

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## Sangamo Displays Tape Systems

**SPRINGFIELD**, Ill. — Sangamo Electric Co. expects to show a family of computer-compatible tape systems for use with minicomputers. The new reel-to-reel systems include a dedicated controller and diagnostic software.

The company said each system will have all the functions of more expensive systems while retaining the computer compatibility of the tape. Controllers for use with up to four tape decks are also available.

The tape systems will sell for less than \$5,000 in quantities of up to 500.

Sangamo Electric Co. is at booths 2500D and B.



Sangamo tape systems can be used with minicomputers.

## Sagetec Data Link Handles 5 Devices

**BURBANK**, Calif. — Model 2600, a data link that is said to allow all types of digital instruments and systems to communicate directly with in-house or time-sharing computers via hard-wire, Teletype printers or data couplers, is scheduled to be shown by Sagetec Corp.

The standard Model 2600 can accommodate from one to five digital devices such as counters, DVMs, shaft encoders, data logging systems, nuclear scalars, digital panel meters or any digital data source having a BCD or binary output, the company said.

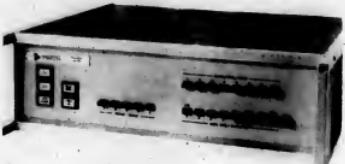
Sagetec said that it has also developed Model 6500, which provides remote digital program-

ming for up to five programmable instruments.

A single channel 2600 is

\$3,300; an expanded unit with 5 data channels, \$4,250.

Sagetec Corp. is at booth 1636,



Sagetec 6515R Data Set

# Cheer up, Holly Holepuncher. Help is on the way.

That's right. There are some people who care about your problems. We don't think a girl should spend her whole life bent over a hot keyboard. So we've

introduced a new optical scanner/card punch that's going to help you and your boss. We call it the Model 710. And it automatically scans and punches up to 6000 cards an hour. So, smile Holly. That means about a half-million fewer keystrokes a day for you.

Leave the card handling to us. We know it'll be love at first sight when you see our little 3x3-foot optical scanner in action. And if your boss has been away in Siberia, or was born in Missouri, have him call or write us right now for additional details.

That's Data Recognition Corporation, 908 Industrial Avenue, Palo Alto, California 94303. Phone (415) 326-4810.



DATA RECOGNITION CORPORATION

## Automata Has Reader for OEM, Systems Use

**RICHLAND**, Wash. — Automata Corp. plans to introduce an optical micro reader for OEM and systems applications.

The 3600 reads pencil marked, preprinted, or keypunched source documents at a controlled rate of speed up to 3,600 document/hr., the company said.

Data is presented at an output jack in TTL/DTL compatible signals, modified to customer request.

Designed for low-cost applications, the unit features a length of 12 inches, optical compensating electronics, remote feed inhibit, and high reliability, the company said.

A variety of interface options are available including a data transmission package for use with the dial network, up to 1,200 bits per second, interface to 7- or 9-track computer compatible tape; and direct interface to an 029 keypunch.

The Automata 3600 is priced from \$1,000 in OEM quantity. The company will be at booth 2212.

## Teletype Terminal Has 15-in. Platen For CPU Printout

**SKOKIE**, Ill. — Wide-format reports generated by computers can be received at remote locations with a new Model 37 terminal being introduced by Teletype Corp. The terminal retains all the features of the current Model 37, and a 15-in. platen to accommodate standard sprocket-fed computer print-out paper.

Model 37 terminals accept all ASCII code combinations and commands. They will be available as receive only (RO) sets, key-to-paper (KTP) sets, KSP sets, and automatic send-and-receive (ASR) sets with a paper tape punch and reader module, a magnetic tape module, or with both paper tape and magnetic tape modules.

Teletype Corp. is at booths 1207 and 1209.



# You can get faster response time out of a 360 by adding more and more memory.



## And you can get warts from frogs.

Terminal-oriented 360's have a habit of getting slower as you add more terminals.  
Adding core doesn't seem to help. Pretty soon you're waiting 30 seconds for answers.

There's a way out. It's called ENVIRON/1.

ENVIRON/1 is a 4thware operating system that can process most real-time applications with a CPU and a core one-size smaller than normally required. And you'll be looking at the data in 2 seconds, not 30.

You can program ENVIRON/1 in either Assembly or COBOL languages. It takes just a week to learn how. And, you can operate under DOS or OS/360 with any System/360 from a Model 25 with a 32K partition, to a Model 195 with thousands of terminals.

If you'd like to get your terminal system out of the dark ages and see the response time you were promised, contact us.

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train a girl to run it in a couple of hours. If she can type, she can enter data on the 480. Verifying on the DATA/SCOPE's 480 character display is about as difficult as watching T.V. And if she still manages to get into a jam, our exclusive "Help" button gets her out. Now there's no reason anyone can't find happiness in data preparation. Especially you; your computer gets a magnetic tape containing 100% accurate data, fully

edited and formatted. No re-systematization is necessary. But you'll believe it when you see it, right? Then write ENTRIX INC., 113 Hartwell Avenue, Lexington, Mass. 02173. Or phone (617) 862-7230.





An aquatic biologist takes a scientific sample for performing a water quality study.

## Pollution Study Aided by River Recreation

APPLETON, Wis. — Scientists at The Institute of Paper Chemistry here are simulating environmental systems on a computer to better understand pollution problems.

Researchers can mathematically recreate their own river and its ecological loads on an IBM 360/44 to study the effects of pollution.

Dr. Robert Holm, director of the Institute's Division of Industrial and Environmental Systems, said: "The research is providing information and insight into pollution problems so paper manufacturers and others can make proper decisions regarding abatement. The computer simulation helps us separate individual or critical problems in more complicated systems."

The computer is used to simu-

late mathematically a river with varying characteristics of depth, width, currents and even rapids. The 360 can also represent the results of such natural processes as biological activity and re-aeration.

The model is based on a material balance formula that calculates the amount of oxygen in the river. In simplified terms, certain forms of pollution use up oxygen, which is needed to support life. The model helps if oxygen is not replenished fast enough, the plant and fish life are affected.

"Without the computer, this type of research just wouldn't get done," Holm said. "The model is extremely complicated because we are dealing with complex systems. Detailed calculations by any other method are impractical.

Simulation in effect allows us to extend instrumentation — to go into areas where it is not practical to measure things directly," Holm said. "Our models are based on fundamental physical laws and describe the real physical system in some detail."

Two common types of water pollution study are biological oxygen demand and suspended solids. Oxidation reaction can occur when organic materials (that can normally be assimilated) are added in quantities that overload the stream and use up available oxygen faster than it can be replaced. Excess suspended solids can pollute the stream when they are sufficient to form a sludge on the bottom and interfere with plant

and fish life.

Since 1940 the Aquatic Biology Group has surveyed more than 10,000 miles of streams and rivers used by the paper-making industry in the United States and Canada.

This group has developed a biological method of water quality evaluation that consists of sampling the aquatic popula-

## Tumor Treatment Kept Current With Computer

TORONTO — Doctors at the Ontario Cancer Institute are using a computer to help them determine more rapidly how to best treat different kinds of cancer tumors.

They decided to use the GE 425 computer to programmed with details of 45,000 cancer cases treated at the Princess Margaret Hospital in Toronto over the past 12 years.

The head of the division of physics at the Institute, Dr. Harold Johns, said that this is the first time Canadian doctors have had access to such an up-to-date broad comparison method which covered all kinds of tumors.

The computer is used to reveal immediately what kinds of treatment are best for the number of patients with certain kinds of tumors, Johns said.

It can also be used to spot trends in cancer that can help identify causes of the disease.

For example, if the incidence of a cancer increases in a certain area of the province, doctors might be able to pick out an environmental factor as the cause.

Johns said that the data bank could be used by doctors at other cancer clinics throughout Ontario by hooking into the computer either through their own terminal, or by connecting the provincial department of health which could then get the answer from the computer.

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powerful Cobol and Fortran compilers; several systems for structuring and manipulating files and large data bases. Plus mathematical and simulation packages.

To run these systems efficiently we gave Sigma 6 byte-string decimal arithmetic (as well as floating point), memory mapping, dual-access memory, an independent input/output processor, and many other high-performance hardware features.

We also gave it anastonishingly low price.

We went into business backwards and came out ahead.



# Mini Proves Worth in Metal Fatigue Test of Planes

FT. WORTH, Texas — A mini-computer is used by the Ft. Worth division of General Dynamics (GD) to check out important structural components of F-111 aircraft.

The system, incorporating a Varian 620/i general-purpose digital minicomputer to analyze cyclic metal fatigue tests, has saved the firm more than \$100,000 in the first nine months of operation, according to Alvin L. Arabian, General Dynamics test engineer. The savings is in terms of fewer man-hours required for the tests and less system downtime.

The purpose of the fatigue test is to enable the builder to determine the effects of various loads put upon key parts during actual flight.

GD can also ascertain the lifetime expectancy of a part — and the plane.

The procedure for the fatigue test is as follows: In aircraft configuration, and attendant safety considerations.

The part to be tested is placed in a test bed, where it is attached to a hydraulic ram.

The ram and the specimen are oriented so that the entire test simulates an actual air load, i.e., a flight condition which actually

would occur during some portion of an F-111 flight.

#### Cyclic Loading Test

The ram then subjects the specimen to a particular number of cycles. The basic testing is cyclic; it repeats itself over a given period of time until the total load upon the part is commensurate with a certain number of hours of flight, time of the aircraft.

According to the part and where it is situated on the F-111 aircraft, the test is repeated under a new set of flight conditions.

Cycles per condition vary, for most of the aircraft, from one to as many as 1,500.

The hydraulic ram, which is the testing "flat" of the entire procedure, follows the in-

struction of the mini.

This minicomputer, with an 8K memory capacity of 16-bit words, generates a sinusoidal signal for the rams to follow, at the same time counts the number of cycles each ram applies.

When the ram has applied as many cycles as it was supposed to for that condition, the minicomputer automatically changes the condition and repeats the process, into a new series of fatigue tests.

While there is still someone in the test bed keeping his eye on everything, the mini is relieving an engineer from initiating and changing the cycle manually.

Prior to using the minicomputer, testers at GD used a function generator which put out a sine wave, and a counter to

count the number of cycles, besides a manual potentiometer to vary the amplitudes of the tests.

Arabian estimates that the Varian 620/i cuts down man-

hour requirements by a factor of three.

Apart from the 620/i, a printer, paper tape punch and a teletype-writer also are used to assist in data handling.



General Dynamics test engineer reads stress information from 17 columns of data on a high-speed printout tape during an F-111 metal fatigue test.

## Manufacturer Fills Same-Day Parts Shipment

ST. LOUIS — With a constantly changing supply of approximately 4,000 kinds of parts, Carr Lane Manufacturing Co. in St. Louis still manages to fill better than 95 percent of orders the same day they come in.

"We're using a computer now to process orders as soon as possible," said Earl Walker, company president. "The time we save handling orders means the shipping department has much more time to locate the needed parts, pack them up and send them on their way that day."

Carr Lane makes and markets through 156 distributors a complete line of components, quick release pins, chuck jaws, gages, bushings, stainless steel components and Carr Lane patented toggle clamps.

As soon as an order arrives, data processing personnel prepare punched cards which are entered into the firm's 360/20.

The cards trigger preparation of an order, packing list, gamma label for the shipment and the necessary records for invoicing which occurs the following day.

As orders are printed, the same data is used to update inventory lists. Analysis of these guides management in recording stock and scheduling manufacturing operations to insure a better than 90% same-day order filling record.

Carr Lane plans to modify its card-oriented 360 to a disk-oriented one. "We start an order and it goes directly to magnetic disks," said Dennis Burke, general manager, "we will be able to analyze inventory faster. We now compile inventory reports weekly. By using disk operations, we'll be able to compile exception reports daily."

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## Mini Plays Three Roles in I/O Processing Of Apollo Telemetry Data at Ground Site

PARAMOUNT, Calif. — A major designer and manufacturer of telemetry ground station equipment has used a computer system to support Apollo missions by relying on a minicomputer for an integral input/output processing and formatting subsystem.

In the Stellarmetrics Inc. Computer Controlled Telemetry Control Center, the Varian 620/1 is used in three-fold role to achieve automatic processing of data at up to 100 kHz response rates.

The computer, according to Stellarmetrics, enables the telemetry station to receive data from a rocket satellite or airplane, for example, and process

it under computer control and in real time. The system also can take data from tape, read it, compress and put it on analog tapes, and run that data from the tape through the ground station equipment and analyze it in stored time.

The threefold function of the computer is to set up, via its stored program, various input and output devices and data preprocessing subsystems, and also to perform computational "number crunching" from data stored on digital tape decks.

If necessary, the computer, a ground station access inputs and start a data run, the computer must execute a program already fed to it which activates each and every component of the entire telemetry ground station.

The computer, in effect, makes a check of each component, setting up all operating parameters in each box that has to touch or manipulate data in any way.

After that, the computer changes hats and acts as a large buffer, accepting data from several

external sources such as a data compressor or format synchronizer, and then takes the data buffer that data to its full capacity so that it can subsequently be output to digital tape or peripheral display devices.

Then, after the data run is completed, and the data has been desynchronized, compressed and entered onto a digital tape deck for storage, the computer begins with an IBM machine or other central processor, the 620/1 performs its third assignment by permitting an operator to go back and replay the tape.

He can enter a new program into the computer and an after-the-fact download feed, do a limited amount of computational work in the minicomputer itself.

In this manner he can get engineering answers to various questions and technicians can feed him the data and solve problems at their leisure.

Stellarmetrics telemetry processing ground station systems are now in operation at various global locations in support of Apollo missions, and at missile and satellite test ranges and data reduction centers.

**Our complete line of readers. One for every system. All with a quick, sure grasp of the cards...**

SR 100 Card Reader — a low cost table-top unit for reading card decks and computers and tape decks. 80-column and 51-column card readers. Demand rate of 100 cards per second. 75 cards per minute. Options available.



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SR 800 Card Reader — a reader for medium-to-high speed card processing designed for maintaining a reading rate of 800 cards per minute. Free memory capacity of 2560 words. Options available.



SR 1000 Card Reader — a high speed card reader designed for massive amounts of data processing. It reads 1000 standard cards per second. 75 cards per second. Options available. Each card cycle time is less than 100 microseconds. Options available up to 2000 cards.



**...and a fast, reliable serial card punch that verifies its work.**

SP 120 Card Punch — the most economical serial card punch on the market! Exclusive design allows complete machine to punch and read a computer without ever stopping. Punches up to 275 cards per second, synchronously.



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## Stockholm Inaugurates Reservation System for Real-Time Rail Service

STOCKHOLM — A rail reservation system jointly developed by the Swedish State Railways and IBM has been inaugurated at Tombelada, Stockholm.

The system uses an IBM 360/65 and an IBM 3976 communications device to give real-time access from terminals operated by counter clerks.

Initially, terminals are being installed in 20 major towns, but the system will support up to 200 terminals. The IBM 3976 data receiver is being used as a terminal.

A real-time service is provided from 4:15 a.m. to 10:00 p.m. The remainder of the time is used in preparation work on train schedules. A back-up service is provided by a 360/50 and a further communications controller originally used for administrative work.

The operational cycle is about 20 seconds. The computer uses OS MFT II, and processes simultaneously the reservation programs, list editing and printing programs, and the checking programs for terminals and transactions.

The Stellarmetrics Series 4024 100 kHz Automatic Telemetry Processing Station uses a Varian 620/1 mini in three-fold rule.

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The Alpha is a 300 line-per-minute printer which makes up to six copies and is priced almost \$1,000 lower than its nearest competitor.

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  - Other

# Adaps Names Goldstein President for 1970-71

**NEW YORK** — The Association of Data Processing Service Organizations (Adaps) has named Bernard Goldstein, president of the 26-member company trade association for 1970-71 at its ninth annual meeting in the Bahamas.

## Societies

Goldstein, president of the United Data Centers Inc. in Greenwich, Conn., succeeds him in his acceptance speech:

"The important thing is that we must, if necessary, operate our businesses as a business, so that we will be able, in the near future, to obtain new capital and stimulate investor confidence."

"A growth industry, such as ours, must have these two things in order to fulfill its manifest destiny. We must recognize that

# Bema Appoints Herzog, Gabetti to Board

**WASHINGTON, D.C.** — The Business Equipment Manufacturers Association (Bema) has named R.H. Herzog of 3M Co., chairman of the board and G.L. Gabetti of Olivetti Corp. of America will serve as vice-chairman of the board.

Herzog and Gabetti will also be members of the planning committee and finance committee, respectively. D.W. Barr, of Meese Business Forms, Inc., will be chairman of the membership committee, and C.W. Spangle, of Honeywell, Inc., chairman of the nominating committee.

Serving on the executive committee for the year ending October 1971 are Herzog, chairman;



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Numerical methods, mathematical models, information processing, computer software, computer hardware and systems, systems hardware, applications, theory of management and administration, technological applications, and sciences of man are included in the categories for classification of papers.

Authors should forward seven copies of their paper, typed double-spaced in English, along with five draft copies of the full text of the paper in English, to the program manager, 3000 words, and should be typewritten, double-spaced, on one side of the sheet.

The first page must carry the following information: title of the paper, name of author, affiliation and mailing address of the author, area of the paper according to the above classification, and Ifip Congress topics; language or oral presentation and a statement of originality.

A set of instructions, properly submitted, to the text, must be included with every copy, but the figures need not be submitted unless requested.

Submitted papers should be directed to: IFC, c/o Prof. C.G. Gottlieb, Vice-Chairman, IFIP Congress '71 Program Committee, Department of Computer Science, University of Toronto, Canada.

Authors will be notified of acceptance or rejection, and the accepted manuscripts, by mid-February 1971. The final copy of accepted papers, ready for publication, will be due by May 1, 1971.

## Educational DP System Gives Hands-on Course to Liberal Arts, Science Students

PALO ALTO, Calif. — Learning how to use a computer is becoming as commonplace for today's young people as learning to drive.

At Gavilan College in Gilroy, Calif., nearly every student—whether his major is history, sociology or physics—prepares for a future in an unusual way. One hundred to 150 students a

day are regularly accommodated.

Almost all of Gavilan's students receive "hands-on" experience with computers before they graduate. Gavilan also brings the students from a nearby junior high school who are proving to be enthusiastic learners.

Gavilan's first venture into computer-aided courses began

two years ago with an antiquated vacuum-tube computer. Herb Peckham, chairman of Gavilan's physical science department, used this computer as a "teaching aid" to prove that a computer could be used advantageously in the school's educational program.

In the fall of 1969, Peckham convinced local school board officials that what the school really needed was a new modern digital computer system that would be totally dedicated to classroom teaching.

That fall, Peckham took delivery of a Hewlett-Packard 2070A Education System.

It was accompanied by several educational-oriented programs—such as a device for reading cards marked with an ordinary lead pencil, a teletypewriter for entering and receiving data, and a photoreader which rapidly read punched paper tape containing computer instructions.

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With its Basic Language, the system was valuable to a large number of students in both science and non-science areas.

A particularly important subject for liberal arts students was statistics, since the subject is a prerequisite to entering many schools or to taking upper-level courses.

Peckham initiated computer-aided statistics at Gavilan to offer the liberal arts students an opportunity to learn and understand the computer.

Unlike the science students, who quickly learn to solve complex problems by devising relatively sophisticated computer programs, the non-science students learn only enough programming to be able to solve their statistical problems.

For both the science and non-science student, programming is relatively easy to learn.

"By using a computer for much of the calculating necessary to solve their statistics problems, the students seem to enjoy the subject matter. They avoid the frustration associated with calculating errors," said Peckham.

For educators teaching with a computer, Peckham warned that some students become more proficient at programming than the teachers.

Seventh and eighth graders from Brownell School spend 2-1/2 hours per week at Gavilan running programs they have



Prof. Herbert Peckham explains operation of the Hewlett-Packard Educational Computer System to a student in his statistics class.

out very capable students," said Peckham.

"Our hopes are to have even greater involvement of the local high schools and junior high schools with the system. With students gaining greater proficiency, using the computer from secondary school through the junior college, we can turn

the computer into one time-share system that will enable 16 local schools to use the computer at one time," Peckham said.

## State Gets Inventory Plan

KIRKSVILLE, Mo. — The Northeast Missouri State College data processing center has completed a computerized Information System for the Commission on Higher Education of the State of Missouri, according to Dr. Robert B. Miller, director of the DP center at the college.

The system is designed to provide an inventory of all facilities in institutions of higher education in the state as well as several reports on selected types of facilities. The Facilities Information System consists of a set of 29 programs which handle the input, processing and reporting of data.

Data is collected from every college in the state on a yearly basis to update the inventory file in terms of additions, changes and deletions to existing facilities.

## Education

day are regularly accommodated.

Almost all of Gavilan's students receive "hands-on" experience with computers before they graduate. Gavilan also brings the students from a nearby junior high school who are proving to be enthusiastic learners.

Gavilan's first venture into computer-aided courses began

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# COMPUTER INDUSTRY

a Computerworld news section about the nation's fastest growing industry

November 11, 1970

Page 67

## CI Notes

### Control Data Seen As Airline Pact Loser

MINNEAPOLIS — Control Data can now be considered among the ranks of "also ran" in the race for the huge computer-based airline ticketing market.

CDC had been a major subcontractor to Burroughs on the recently canceled TWA system [CW, Oct. 28] and had also been a subcontractor to Univac on the system that was originally canceled last February. CDC lost around \$1 million on the UAL deal and stands to come up \$8 million short on the TWA contract.

Since IBM has apparently grabbed both the UAL and TWA contracts, industry sources consider it unlikely that the CDC machines will be used to supplement the presently planned systems.

### ICL-Plessey Sign Plated Wire Memory Agreement

LONDON — A \$2,160,000 order from ICL Components Ltd. for plated wire computer memory systems has been announced by The Plessey Company Limited's Components Group. The systems to be supplied by Plessey are its 250 series, a 290 nsec cycle time, self-contained modular unit.

### Data Action and Talcott Sign Leasing Agreement

MINNEAPOLIS — Data Action Corp. has announced completion of a leasing agreement with Talcott Computer Leasing, a division of James Talcott, Inc. of New York.

Under terms of the agreement, Talcott will purchase up to \$6 million of Data Action's equipment over a period extending from October 1970 to December 31, 1971.

Present products included in the agreement are the Data Action Magnetic Data Inscriber, Tape Pooler and Date Editor.

### Ampex Core Memory Delivers Hit 1000

CULVER CITY, Calif. — Ampex Corp. has delivered its 1,000th 18-mil core memory stack. The delivery was made to Digital Equipment Corp., Maynard, Mass., as part of a recent contract. The 3-D, 3-wire Ampex stacks are in demand in memory memories of DEC computer products.

Ampex claims it has delivered more memory stacks using 18 mil cores than any other independent supplier. The Ampex stacks delivered to DEC accommodate cycle times of 800 nanoseconds.

### CW and Computer Exposition Drop Acquisition Discussions

NEWTONVILLE, Mass. — Discussions between Computerworld, Inc. and Computer Exposition Inc. regarding the acquisition of Computer Exposition by CW have been discontinued, CW spokesman reported.

A CW spokesman said that the discussions were called off when it was clear that agreement on a basis for acquisition was not likely to be reached. Computer Exposition operates the regional Computer trade shows.

## Adapso Speaker Sees High Growth in Services Sector in Next 5 Years in Spite of DP Shakeout

NASSAU, The Bahamas — Even though the services sector of the computer industry is apparently undergoing shakeout, members of the Association of Data Processing Service Organizations (Adapso) were assured of a healthy future at their recent management meeting here.

On the plus side, the keynote speaker, Patrick J. McGovern, president of International Data Corp., while noting that a shakeout was underway, predicted that the service sector will experience the same kind of growth rates in the industry during the next five years.

On the minus side, Adapso Executive Director Jerry Dreyer noted that out of the 67 members joining the organization in the last year, 54 have had to drop out due to mergers, acquisitions, bankruptcies, etc., with the dropouts, however, Adapso did gain 13 new members and now claims to represent 50% of the sales volume of the service bureau industry.

McGovern said the bulk of service bureau growth will come from the increase in remote access data processing services and from the sale of proprietary software packages.

He observed that while on-site batch service bureau business will grow by 10% during 1970 from \$750 million to \$825 million, remote batch will increase by 50% from \$60 million to \$90 million.

By 1974, McGovern predicted, the on-site batch market will be \$1.2 billion in annual revenues, while remote batch will have more than tripled to \$300 million in the same time period.

In contrast, he said, remote access immediate response services (Rair) is enjoying a 40% growth this year, and is expected to reach \$165 million by 1974. By 1978, McGovern predicted, the annual Rair business will be close to \$600 million.

McGovern estimated the contract and packaged software market at \$560 mil-

lion in 1970, increasing to approximately \$2.3 billion by 1974.

He indicated that the current shakeout would affect primarily undercapitalized and undermanaged firms. He expected that the number of firms in the service bureau business would decrease by 20% during the 1970-71 period, but the end result would be a healthier business condition for the surviving firms and for the customers of the industry.

Some concern was expressed at the meeting about competition from the new IBM Basic Systems Centers, which were established to support the application of System/3.

One member said that these centers were offering data processing services to and becoming a growing competitor in the business and he indicated that this might be a violation of IBM's 1956 consent decree.

In relation to time-sharing, the association's Computer Time-Sharing Section, consisting mostly of managers of eight interstate tariffs being proposed for lines connected to computers, according to Thomas O'Rourke, president of Tymshare of Palo Alto, Calif.

These so-called Isat tariffs are typically three to five times higher than the regular tariffs, he said, and he noted that the CTSS had helped defeat one proposal in Ohio and was fighting another in Illinois.

## Nanomemory 2500 Cycle Time Is 500 nsec, Access Time 300 nsec

HAWTHORNE, Calif. — A core memory system available to the public from Electronic Memories Inc. has a cycle time of 500 nsec and an access time of 300 nsec.

The Nanomemory 2500 is a development of the company's Nanomemory 2600 that has a cycle time of 600 nsec. The main differences between the two products, the company said, are a change in core size from 22-mil to 18-mil, and a change in the memory array.

The advantage to the customer of this evolutionary development, the company said, is that he is not gambling with a prototype design. He's receiving, the company continued, a standard system with proven performance and reliability. The Nanomemory 2500, with a core capacity 24/24 core memory, is capable of storing up to 294,912 bits in a single standard 19 in. rack. Configurable with word lengths of 8, 12, 16, 18, 20, 24, 28, 32, and 36 bits are available. Priority checking by 8-bit byte or word is optional.

All system electronics and stacks are built on plug-in printed circuit boards for easy replacement as well as field expandability.

The price per bit of the Nanomemory 2600 starts at 6 cents. The memories are

**McDonnell Douglas Automation Company Names Orthwein Head**

ST. LOUIS — James S. McDonnell, chairman of the board of McDonnell Douglas (M-D), announced the expansion of McDonnell Automation Co., to McDonnell Douglas Automation Inc. as a computer service business actively pursuing the regional and national markets.

A CW spokesman said that the discussions were called off when it was clear that agreement on a basis for acquisition was not likely to be reached.

Computer Exposition operates the regional Computer trade shows.

currently in production.

Electronic Memories is at 12621 Chadron Ave. .

## American Airlines Is Still Looking For Better Automated Ticketing

By Michael Merritt  
co-senior writer

NEWTONVILLE, Mass. — American Airlines has a market and is looking for suppliers.

American's assistant vice-president for ground passenger services, Rodney W. King, said in a recent interview with CW that the airline is still interested in finding companies amenable to computerization. And while American has been conducting several experiments, it is still looking for the best way to automate.

King estimated that American could use automated ticketing for about 20,000 tickets a day right now, with that figure gradually tourtured in the next 10 years.

"And American is only one airline," he added.

Describing his firm's efforts to automate ticket printing and vending, King said that American had good results from an experiment conducted at O'Hare Airport in conjunction with IBM and American.

At the O'Hare installation standard IATA tickets were printed and magnetically encoded following the passengers' instructions via pushbuttons. The passengers' credit cards, also coded with a mag stripe, were also read automatically. "Our surveys showed that with magnetic ticket vending (ATV) had 99% acceptance," King said. He also noted that American can put the system into operation whenever it feels that the savings in clerk time will equal the cost of the installations.

### Credit Card Encoding

But King's man request was for a way of encoding credit cards. For either the ATM system or American's other exper-

iment, the Jets (Jet Express Ticketing Service) system to work, they must be able to read credit cards that can't be easily counterfeited.

The Jets system is less complex than automatic ticket vending. It is designed to sell simple one-way or round-trip tickets by issuing a coupon rather than a standard plane ticket.

King said that 35% of the tickets American sells itself are on simple one-to-B or A-to-A flights, representing in the neighborhood of 20,000 tickets a day that are now prepared by hand.

"The idea of Jets is so solid, so correct that our desire is to get it progressed rapidly — next month if we could," he stated.

And though most elements of the Jets system are ready to go, American's subcontractor has not solved the problem of getting the passengers to accept encoded credit cards that feed the system.

"American's reservations system, Sabre, dumps its information concerning a Jets flight into the Jets minicomputer. The mini in turn handles all ticketing from then on — even being able to satisfy seat preference, in an advanced design.

Simplifying, King said, is to handle the more complex keyboards for the ATM system.

"We've received good support from the computer industry," King noted, "but we are still searching for somebody with an innovation." He added that "there is a large potential market for peripherals for the ATM system."

"We're looking at all the possibilities — mag cards, OCR devices, embedded cards, and we're willing to look at more. Maybe there's somebody out there with an entirely new concept."

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## Contracts

**Electronic Memories** of Hawthorne, Calif., has received an order in excess of \$1,200,000 from the Department of Defense for delivery of large-scale core memory systems.

**Univac** has a contract, valued at more than \$1 million, from the Chicago Board of Education that calls for Univac to supply a 418-111 computer, 105 UniScope 100 graphic displays and supply operating programs or software, for the implementation of a computer-assisted instruction project.

**Burroughs Corp.** has received a contract from the U.S. Air Force Logistics Command, valued at more than \$500,000, for the lease of six computer-output-microfilm units.

**System Development Corp.**, Falls Church, Va., has received a \$717,000 labor-hour type contract from the U.S. Navy to develop new computer systems to help monitor submarine and surface ship movements.

**Beloit Computer Center, Inc.**, Beloit, Wis., has announced that the city of Baton Rouge and parish of East Baton Rouge, La., has purchased the rights to use the center's municipal accounting and reporting system, Mars, in its data processing facility.

**Computer Audit Corp.** of Silver Spring, Md., has been awarded a contract from Drexell & Dominick, Inc., New York, for \$90,000 for development of a turn-key communications system to replace its present IBM CCAP message switching system.

The City of Spokane, Wash., will use census tract and block data gathered and processed by Boeing Computer Services in its urban planning, under a \$33,000, 14-week contract.

**Public Safety Systems, Inc.**, a subsidiary of General Research Corp. of Santa Barbara, Calif., has been awarded a three-year contract by the City of Huntington Beach to develop an integrated command and control system for the city's emergency forces.

**Informatics, Inc.**, Canoga Park, Calif., has been awarded the contract for development of a generalized computer data management system for the State of Hawaii.

**Automation Processing Corp.**, a subsidiary of Data-Plus Systems of Kentington, Md., has a two-year data processing contract with the Albany Motor Club, Albany, N.Y.

**Information and Communication Applications**, of Silver Spring, Md., has been awarded a contract by the Post Office Department to provide services in support of a computer-controlled system that uses airline schedules and Zip Codes to route mail pouches and generate airmail dispatch billing data.

**Amplex Corp.**, Culver City, Calif., has received a contract exceeding \$600,000 to supply lithium cores to Pitney Electronics Corp., Hihiland, N.J.

**General Dynamics Electronics Division**, San Diego, Calif., and Kaman Corp., Bloomfield, Conn., have each been awarded a \$300,000 contract by the Air Force Systems Command's Electronic Systems Division for definition studies on the Airborne Weather Reconnaissance System.

**RCA** has announced an Air Force contract for \$1.9 million to develop a computerized system that will do performance checks on jet engine fuel controls.

The Colorado School of Mines, Golden, Colo., has received a \$117,000 grant from the State Department of Natural Re-

sources to conduct a Colorado lands use and natural resource inventory.

**Computer Sciences Corp.**, of Los Angeles, will develop a comprehensive sales training program for the 21 operating companies of the Bell System under a \$155,000 contract from American Telephone & Telegraph Corp.

**Cadcom, Inc.**, Minneapolis, Minn., has been awarded a contract by the Office of Naval Research to evaluate the applicability of computer-aided design concepts to design of externally mounted electronic systems on advanced submarines.

**Management Research International, Inc.**, (MRI) Austin, Texas, has a joint licensing agreement with Control Data Corp. to provide MRI's Data Management Systems 2000 through CDC's Data Services Division in the U.S., Mexico, Europe, and Australia.

## Edak Operations Analyzer May Eliminate Need for Job Tickets

**SANTA MONICA, Calif.** — A system for on-line collection and analysis of operating data on continuous process equipment and machinery has been developed by Bissell-Berman Corp., a subsidiary of Pitney Inc.

Known as the Edak Operations Analyzer, the system is designed to monitor as many as 56 (or more) causes of equipment down-time and up to four measurements of productivity.

It is said to eliminate the need for operator crew cards or job tickets, yet is compatible with the customer's computer, operation.

The basic Edak system is made up of four units: a selector panel, power supply, data storage module and readout device. Operation is as follows:

The selector panel and power supply are wired into the main control panel and power source, respectively, of the equipment to be monitored. At the beginning of each shift, the equipment operator plugs a data storage module into a receptacle on the selector panel.

When the machine stops — for any reason — the data module automatically starts accumulating the elapsed time. Then before the equipment can be started up again, the operator must select the appropriate "reason" for the down-time on the selector panel.

This action causes the accumulated time to be assigned to its proper down-time data channel within the module. The equipment is then free to operate as usual.

Costs of the Edak system vary according to the number of functions to be monitored and the type of readout device required.

The Bissell-Berman Corp. is at 2941 Nebraska Ave.

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You see, we're not only semiconductor experts, nor are we only computer experts, we are both. Our circuit designers were developing semiconductor memories as long as

five years ago. Our systems people developed memories for the most advanced computers. And we back this all up with manufacturing people who produced TTL products for the largest suppliers in the industry.

By bringing together people from both sides of the fence, we've been able to combine highly reliable semiconductor processes with advanced computer memory organization techniques.

To demonstrate this capability, let's look at some of the products we are introducing this month. Our first is the fastest 1024 ROM on the market with the lowest power dissipation around. We can program it to your requirements with only a three week turn-around time.

Next is a 256-Bit Read/Write RAM with associated decoder driver. It is loaded with good features — fast cycle time, low

## Mini Joint Makes a Splash

PALO ALTO, Calif. — The first and only mini joint computers conference was held here and appeared a smashing success.

Nick Horn of Century Data Corp. and Norm De Nardi of Singer/Librascope were co-chairmen.

This initial venture was modestly touted since the originators weren't sure how it would work out. Now there is enthusiastic talk about going on to bigger and better mini joints.

It was put together because of concern for all the people whose travel budgets were being cut and would be unable to be in Houston for the Fall Joint Computer Conference.

The exhibitors were very pleased with the exhibit and wish to make it a regional show on a quarterly basis.

It is estimated it will cost each participant only \$100 for his participation.

One exhibitor said: "I think maybe we should pull out of the JCCs and spend money on more regional shows. There is real interest here, not just 'walk throughs' looking at exhibits for the fun of it."

There were 10 exhibitors, including two manufacturers' representatives showing more than one product. It was estimated that there were 500 attendees.

### CW West Coast Bureau

SAN FRANCISCO — Creation of the Pacific Coast Real Estate Exchange portends a new development in the real estate business and another instance of computers improving the business community's practices.

The exchange opened in August and already has \$1.6 billion of properties committed to the file and 85% of the major brokers in the area covered have signed up for service.

According to Gerald J. Jackins, president of the firm, it would have been impossible to provide his type of service without the speed and economics of super-scale computers.

The firm uses the Control Data Cybernet system, hooked up to the CDC 6600 in Palo Alto with backup at the Los Angeles facility.

A mainframe is used as the I/O medium in the exchange's offices.

None of the service is to match up buyer, broker and seller specifications with the best selection of properties available. Cost of use of the 6600 is minimal so that there is just a token fee for the computer service. "Our profit is made

when we find a property match," explained Jackson.

There are 10,000 listings now in the field and each property is described through 200 different items. By the end of 1970 they expect to have the service operating in Los Angeles to serve the southern part of the state, and 18 cities have been selected for the national expansion.

## CII Comes up Winner With Loss

BROOMFIELD, Colo. — What happens when a company reports 1969 earnings of \$500,049 and in 1970 turns up a loss of \$305,545 — and the stockholders love it?

Computer Investments Inc. (CII) gave this report at its annual meeting this month but stockholders loved the rest of the figures.

In June 1969, fiscal year ending date, CII reported a drop in backlog of orders to \$24,662. This year the backlog is up to \$3,201,569.

The company hired John Zisch as vice-president of sales and marketing to help the go-ahead to build up a marketing force which now includes eight major sales offices and five supporting service offices.

Marketing cost was \$400,000 for the year, but it evidently paid off.

In 1969, OEM accounted for \$206,133 of the backlog. CII had signed an OEM agreement with Ford Motor Co. last December but found that it couldn't target the market. In 1970, OEM sales were down.

Contract sales had been \$10,374 and this year they are \$31,694.

Direct sales by its own marketing force accounted for only \$32,155 of the earlier backlog and this year it accounts for \$31,140,666.

Of this \$31,140,666, the bulk is a \$2.4 million sales agreement with Ford Motor Co. for source data collection units to be used throughout its plants.

So far \$150,000 of equipment has been delivered and the order could go much higher than the original agreement if Ford expands use of CII units to all its plants.

## Babcock Sees Trend Toward Hybrid Line

CENTURY CITY, Calif. — "Business is too tough to have IBM as the only supplier," said James Babcock, chairman of the board of Allen-Babcock Computing, Inc., as he announced to users of its time-share system recently that they now would be able to realize up to 50% in savings.

"We have returned to IBM about \$500,000 a year in bulk core and now have Ampex core. By this step alone we have been able to pass on sizeable savings to our customers and increase our profits. This is only the beginning. Our next step is replacement of disks, tapes and communications," he said.

Babcock predicted that the trend in the 70s will be toward the hybrid line, and that the day may come when users buy only the CPU from mainframe manufacturers.

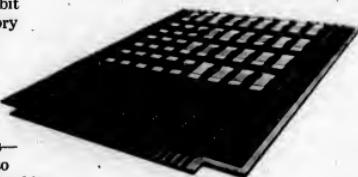
His advice to users considering outside peripherals is to be sure that they are 100% compatible. He also recommended asking for the name of some customers

power and DTL/TTL compatibility. If you prefer memory subsystems, we have a standard Read/Write 1024 words by 9 bit memory for your buffer or main memory applications. Our memory subsystems are on standard 5 by 7 inch PC cards, organized to the memory size you require. Four different configurations are available now.

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A final word about our testing capability. We've developed a sophisticated, high speed test system for both components and subsystems. There's none like it. Our 256-Bit RAM, for example, goes through

### Industrial Sites Located

MONTGOMERY, Ala. — Development of a computerized system of locating industry in Alabama is scheduled as part of a \$250,000 federal grant.

Boeing Corp., Huntsville, will provide technological aid. Data teams will input information on an area's transportation facilities, labor pool, available utilities and industrial sites. Plant officials seek new sites that match their needs with individual areas in the state.

# DP Industry Can Learn From Comparison With Others

By Matthew E. Giffit,  
Special to Computerworld

The years 1963 and 1964 for the computer industry might be looked upon as the dawn of a new era. Starting then, the industry has introduced concepts and technologies that are accepted as buzzwords today: operating systems, data communications, time-sharing, whole businesses such as third-party leasing, software houses, facilities management, etc.

As long as this industry and its users were expanding at a rapid rate the excesses and problems building within the industry did not become apparent.

However, 1970 seems to be marking the year of account for the industry, in which many a management is finding that penitence, prayer and charity alone cannot avert the severe decree.

There seem to be no substitutes for management, marketing and capital. The murky view is very much like

alphabet soup - ranging from Astrodata through CAI, Data Products and Televex to the fabled Vistron. Among these are some of the names that have appeared in financial trouble in recent days.

## Allegory Remote?

Unfortunately, the biblical allegory seems too remote for most people. The computer industry might learn a lot, however, by recognizing that it may not be as unique as most thought during the past decade.

Through being more conversant with the history of other businesses, the EDP industry might better plan and recognize the problems ahead.

In particular, the EDP industry has often been related to the automotive industry, but usually only in the sense that by 1975 outside revenues of \$3 billion will be about the same.

In fact, the comparisons go a lot deeper.

They have their Ralph Nader, we have

our Herb Grossch. They have products ranging from a Yamaha bike to a hand-

## Viewpoint

tooled Maserati; we have equivalents ranging from Vistron to CDC.

We have five carmakers struggling to hold on, they still have American Motors. And in that alphabet soup I mentioned, you can pick any one of them and relate it to a name like Packard, Kaiser, Desoto, Hudson, Studebaker, Corvair, and, of course, Edsel.

Looking back, for their Charles Kettering we certainly had von Neumann. And it is only fair that Tom Watson Sr. be credited with being our answer to Alfred Sloan.

What can we learn than, and perhaps project, from comparison of the two industries? Moving from machine level to assembly level coding was comparable to

the development of the synchronous transmission.

The coming of operating systems can be directly equated to the automatic transmission.

The concept of a computer utility, on the other hand, is comparable to the entire public transportation network in that no matter how efficient and cheap it becomes, there would be those who would ride in their own cars, which creates, of course, machine overcapacity.

AT&T's planning, or lack, for its communications network is not very much different from the highway planning of the 50s. Invariably, their capacity was inadequate by the time they were completed.

I would contend that the system 360s and series 200s of the 1960s were but the horseless carriages of our industry.

The minicomputers of the 70s which will be used as front-ends, terminals, concentrators, peripheral controllers, and yet underpins of any close thing, to the Model-T of our industry.

The financial turmoil in the industry now is comparable to an era which led to the founding of General Motors and Chrysler, and is bound to leave an indelible mark on the history of our business.

In the absence of expansion personal advancement becomes increasingly difficult. At the other extreme are those who have been or may yet be at least temporarily dislocated.

The smooth will see clear, however, and the road for correction is near. Companies and individuals in the DP industry must see to it that what evolves and what is supported is a healthier climate in which true and traditional competition prevails.

In the short run those less fortunate can be assisted in placement. In the long run better development of the market and the personal career planning can become strong influences for good on the future of dynamic and exciting industry.

*Matthew E. Giffit is executive vice-president for planning at Honeywell Information Systems Inc.*

## Market for Low-Cost Bulk Storage Called Growing Opportunity

COMPTON, Calif. — According to Dr. Donald Gimbel, vice-president of Genesee Technology Corp. here, low-cost bulk storage for computers is a market that cries for the entry of medium to large mass producers, and that is what his company is doing.

"At present," he noted, "a minicomputer user can pay more for the peripherals than for the computer. If he wants to save money he has to go outside the main manufacturer."

Peripheral manufacturers can produce units for a lower price for two reasons:

First, they are strictly in the electro-mechanical field, which the computer company is not. As Gimbel puts it, "It's a different kind of fish."

Secondly, the computer company doubles price because of the problems of stocking parts, maintaining an inventory and producing service. While Genesee's products are much lower than those offered by the computer companies, "We are not giving away the store," he said.

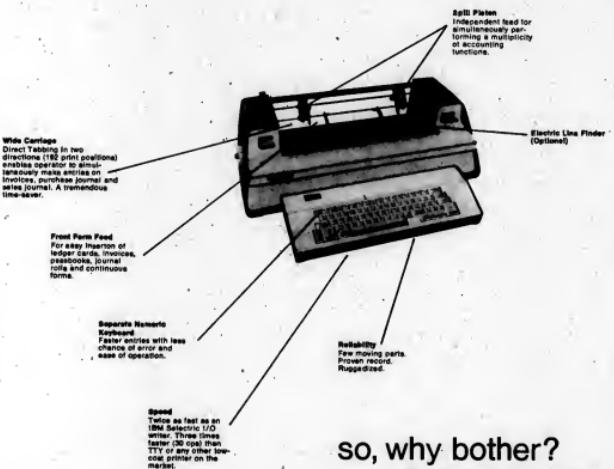
As far as the health of the industry goes, he said that potential customers now make unexpected plant inspection trips and ask for financial statements.

There is a situation never before known in the computer industry," he said.

The tape cassette field, he said, is lagging behind Europe, which is well along the way towards standardization.

In August 1970, the standards were drawn up and will be submitted for adoption this December.

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## Nickels and Dimes

Bit by bit, Levin-Townsend Computer Corp. is extricating itself from Las Vegas. The troubled leasing company had made several real estate acquisitions in the city, but had to find that it knew the computer business better than it did real estate. Among the properties bought by its 82%-owned National Equities subsidiary was a country club. Now, the company has sold most of its land and several other properties for \$4.25 million and assumption of liabilities totalling about \$7.5 million. National Equities previously charged an extraordinary write-down of \$9.3 million against its Nevada assets. The company's fiscal year ended March 31 ... As a result, it said, it won't report any gain or loss on the sale in its current fiscal year. The purchasers were Realty Holdings, Inc., and Country Club of Las Vegas.

555

California Computer Products, Inc., reported net income of \$419,788 on revenues of \$8.6 million for the first quarter of 1971, compared with earnings of \$93,780 on revenues of \$4.6 million for the same period last year. On a share basis, earnings amounted to 18 cents per share on 2,276,671 average shares outstanding, compared with four cents per share on 2,262,047 average shares outstanding. The 350% increase in per-share earnings and nearly 100% increase in revenues for the period represents the largest first quarter in company history.

555

Standard Register Co., major manufacturer of business forms and equipment, has announced that for the third quarter of 1970 ending Oct. 4, net revenues rose to \$25 million, up from \$24.9 million in the same period last year. Nine-month revenue was \$74.9 million, up from \$74.1 million in the same period last year, when net revenue was \$75.6 million. Net after-tax income for the nine-month period decreased to \$2.8 million, or \$1.30 per share from \$2.9 million, or \$1.37 per share a year ago. For the quarter, net earnings were 30 cents or \$652,128, equal to 30 cents per share. In the same period of 1969, net after-tax income was \$854,773, or 40 cents a share.

552

Breckman Instruments, Inc., of Fullerton, Calif., has reported a flat first-quarter. For the three months ended Sept. 30, Breckman earnings totaled \$862,213 on sales of \$31.1 million, compared with earnings and sales of \$875,411 and \$31.2 million in the previous year. Earnings were 25 cents a share for both periods. "Although the domestic economy is softer than a year ago," said Dr. William F. Ballhaus, president, "we have been able to hold sales and earnings at approximately last year's levels."

## Unit Bright Spot

# CDC's DP Still in Red

**MINNEAPOLIS** — The computer half of Control Data Corp. is still losing money.

Last of the dwarfs to report for the most recent quarter, CDC reported that only the operations of its Commercial Credit subsidiary saved it from plunging into the red.

Losses before extraordinary items and Commercial Credit's earnings totalled \$4.4 million for the quarter, or \$1.14 per share for the nine-months-on-total revenues of \$132.4 million and \$40.8 million respectively. Including Commercial Credit's and extraordinary items, net earnings were \$5.5 million and \$9.9 million or 36 cents and 61 cents a share.

For the two periods in 1969, the overall CDC picture showed net earnings of \$12.2 million and \$42.7 million, or 83 cents and \$2.90 per share. Total revenues in 1969 were \$137.1 million for the quarter and \$410.5 million for the nine-months-on-total revenues of \$132.4 million and \$26.3 million for the nine months.

### R&D Holds Up.

Despite the losses, CDC's R&D budget had held up quite well during the third quarter of 1970. R&D expenses were \$74.4 million, while in 1969 they were only \$6.8 million. Over the nine months, R&D expenses are substantially flat. Since CDC depends on innovation for its competitive edge, maintenance of a long-term bright spot is a long-term bright spot in a gloomy short-term picture.

In the second quarter computer operations had experienced a loss of \$5.6 million.

Early in the fiscal year CDC President William C. Norris had predicted that the company would be in the black by the end of the year. He could be sad.

"Although we expect that the second half will show some improvement after the first," Norris said when announcing second-quarter results, "the year as a whole in the computer portion

of our business won't be profitable."

At that time he went on to say that while CDC had seen some improvement in orders, deliveries would not come until 1971.

CDC's situation was also improved by estimated tax credits of \$2.3 million for the quarter and \$10.1 million for the nine months. Extraordinary items, primarily tax credits on the basis of foreign subsidiaries, were \$322,000 and \$253,000, respectively.

According to its preliminary figures, establishment of general reserves of \$7 million, losses on

## COMPUTERWORLD

# financial

## \$4.6 Million Loss Expected By UCC in Third Quarter

DALLAS — University Computer Corp. is predicting a \$4.6 million loss for its third quarter.

According to its preliminary figures, establishment of general reserves of \$7 million, losses on discontinued operations of just over \$1 million, and increasing losses of nearly \$250,000 — a total of approximately \$8.4 million — are responsible for the net loss.

The drop was partially offset by about \$2.4 million in gains and investment income from unconsolidated insurance subsidiaries, along with about \$1.4 million of tax loss.

UCC reported a profit of \$3.2 million for the third quarter of 1969.

The company estimated its revenues at about \$2.9 million for the quarter, well down from \$3.2 million a year earlier. Nine-month revenue was about \$98 million, up from last year's \$74 million, however.

The \$7 million reserve was set up for contingencies relating to investments, other assets, and the company's divestiture program.

UCC President Charles J. Wyly, Jr., said the determination of the reserves reflects the judgment of the company's management as to possible future losses in those areas.

He emphasized that the reserves were for future contingencies.

## Booth Computer Earnings Increase, Greyhound Computer Net Falls 28%

As for the leasing companies, it's up and down. In San Francisco Booth Computer Corp. announced that its third quarter earnings were up 24%, while in Chicago, Greyhound Computer said that per share earnings for the third quarter were off 28%.

For the quarter, Booths earned \$785,000 on revenues of \$10.2 million, or 42 cents a share.

This compares with revenues of \$9.8 million for 1969, which brought earnings of \$634,000 or 33 cents a share.

For the nine months Booth revenues were a record high of \$30.7 million, with earnings of \$2.3 million or 73 cents a share. This company, with revenues of \$28.4 million and earnings of \$2 million or \$1.10 a share for the nine months ended Sept. 30, 1969.

Fully diluted earnings for the quarter were 39 cents a share in 1970, and 32 cents in 1969. For the nine months ending Sept. 30, 1970, fully diluted earnings were \$1.12 a share compared to \$1 in 1969.

**Greyhound Results**

Greyhound Computer Corp. had consolidated net income of \$764,000, or 18 cents a share, for the third quarter of 1970, down from net income of \$1 million, or 25 cents a share, in 1969.

For the nine-month period ending Sept. 30, net income

totaled \$2.5 million or 58 cents a share, compared to \$3.7 million, or 85 cents a share, in 1969.

Revenues for the nine months ending Sept. 30, 1970, were up 10% to \$19.7 million in 1970, from \$37.1 million in 1969, but third-quarter revenues declined to \$12.4 million from \$12.8 million in 1969.

W. Carroll Bumpers, GCC president and chief executive officer, attributed the decline in earnings primarily to the loss of revenue from the company's main equipment during the turnaround period between customers and cited a slowdown in the markets for data services as a contributing factor.

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## Telex Earnings Rise

TULSA, Okla. — The Telex Corp. has reported that for the fiscal half-year ended Sept. 30, company net income was \$5.2 million compared with \$1.8 million for the same period last year. Fully diluted earnings per share increased to 50 cents from the 18 cents per share earnings a year earlier.

Telex sales for the six-month period increased from \$22.6 million to \$40.4 million.

For the quarter sales increased from \$13.1 million to \$23.7 million. Fully diluted earnings per share for the second quarter were 27 cents compared with 10 cents a year earlier.

Telex President S.J. Jatras attributed improvement in company performance to the company's expansion of Computer Products Group which sells and leases computer peripheral products.

Booking improved from \$21.1 million last year to \$28.5 million.

## Com-Share Losses, Sales Rise for Year

ANN ARBOR, Mich. — Com-Share, Inc. has reported a net loss of \$3.5 million or \$4.36 per share for the year ended June 30, 1970, compared with a loss of \$2.3 million or \$3.94 per share as restated for the previous year.

New sales were \$4.9 million up from \$3.9 million a year earlier as restated.

For the first quarter ended Sept. 30, 1970, the company reported a loss of \$365,000 or 47 cents per share (unadjusted), down sharply from the loss of \$1.1 million or \$1.47 per share (unadjusted) for the same period last year.

Quarterly sales increased to \$1.3 million from \$1.2 million. The company attributed the improved quarterly results to reductions in operating expenses as well as increased sales.

### Accounting Changes

Com-Share noted its financial statements for 1969 have been restated from amounts previously reported to reflect

reclassifications and certain accounting changes.

The increase in accumulated deficit as a result of these changes was \$802,423 at June 30, 1969, of which \$736,760 is attributable to the year ended June 30, 1969, and the balance to prior years.

Com-Share now reports on a straight-

line basis over the lives of the agreements the revenue received in the form of common stock in other companies, in exchange for providing services.

This change in accounting method resulted in an increase in the loss for years ended June 30, 1970 and 1969 of \$55,504 and \$723,818 respectively.

## Printer Designed to Cut Delays

NEW YORK — A high speed printer, designed specifically to eliminate peak trading order backlog within the financial industry, is being manufactured and marketed by the Shepard Division of Vogue Instrument Corp.

Several Shepard printers are already operating on a test basis within the securities industry.

Capable of receiving and printing 60 trading orders a minute, the printer, Model 828, is said to be the only high-

speed terminal that produces an order ticket in the format accepted and approved by the Floor Committee of both the New York and American Stock Exchanges.

With operating remotely via telephone lines, it has a full-line buffer of 28 characters with an additional 50 character reserve to assure uninterrupted transmission, Shepard said.

The printer, when used on the trading floor of an exchange, can eliminate backlog of trading orders, handle up to 10 hours and handles the workload of several teletypewriter novices located at each trading post and at many booths maintained by member exchange firms, according to the manufacturer.

The printer is said to furnish instant order capabilities, a safe guarantee in delivering opening price orders, and faster and quicker operations on the exchange floor.

Current communications transmission facilities within the major exchanges are not capable of transmitting 60 buy and sell orders a minute to each terminal, and the Shepard printer can match that capability.

At crucial times during the trading days, such as at the opening, the speed of the printers can guarantee the receipt of opening price orders for timely execution, Shepard said.

## ADP Reports Record Earnings, Revenues

CLIFTON, N.J. — Automatic Data Processing, Inc. (ADP) has reported record revenues and earnings for the first quarter ended Sept. 30, 1970.

Net earnings rose 47% to \$787,929 or 16 cents per share from \$558,449 or 12 cents per share a year ago. Gross revenues increased 20% to \$103,12,568 from \$8,071,752.

The company also announced that its common stock, now traded on the Amex, is scheduled to be traded on the New York Stock Exchange effective Nov. 10, 1970.

ADP offers payroll processing and other commercial data processing services from its nationwide network of computer centers.

## Optical Scanning Has Red Quarter

NEW TOWN, Pa. — Optical Scanning Corp. disclosed a consolidated loss for the quarter ended Sept. 30, 1970 of \$348,800 or 64 cents per share, compared with consolidated net income of \$146,900 or 27 cents per share (including tax benefits of one cent per share) for the same period a year earlier.

Gross revenues decreased to \$1.4 million from \$2.7 million, down 47% from the previous period.

The anticipated loss for the first quarter of the new fiscal year was due to an overall decline in the computer business that has resulted in order cancellations and reduction of backlog of orders. During this period, operating expenses were reduced, the company said.

Optical Scanning designs and manufactures electro-optical systems which "read" business forms to acquire data for input to computers.

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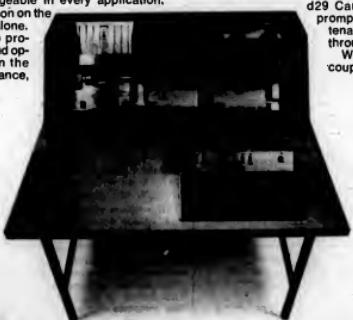
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# Lobbying Would Call Congress Attention to DP Plight

By Phyllis Huggins

CIV West Coast Bureau

When the computers slow down, watch out!

And the computers are slowing down. This is an economic indicator of its own, not just for industry and business but for the state of economic health in this country.

Computer sales are off. Forecasts have hit the dust. Orders that were placed for new equipment are being stretched out.

## System Development's Earnings Rise, Sales Drop in 1st Quarter

SANTA MONICA, Calif.—System Development Corp. (SDC) has reported earnings of \$428,000 and sales of \$11.6 million for the first quarter of fiscal 1971 which ended Sept. 27, 1970.

This compares to earnings of \$57,000 and sales of \$14 million for the same period last year.

SDC President Wesley S. Melahn said the higher earnings were influenced materially by the tax loss carryforward. This carryforward, he noted, would be used up early in the second quarter. He said other factors which contributed to the first quarter's increased earnings involved reduced administrative, research and development costs.

Fiscal 1970 total sales declined approximately 17%—caused primarily by continued cutbacks in the military market. Melahn pointed out SDC's Public Systems Division followed its upward trend initiated last year. The division reported first quarter sales of \$1.8 million—a 20% increase over last year's record first quarter figure of \$1.5 million.

Major contracts in the Public Systems area which had an impact on increased revenue included a \$1.5-million award to develop an integrated municipal information system in Charlotte, N.C., and an \$852,000 contract to develop a system for improving freeway diamond interchanges for the U.S. Department of Transportation, Bureau of Public Roads.

Other important efforts begun during the quarter included Space and Range Division's \$2 million "Pepé" (Parallel Element Processing Ensemble) contract with Bell Labs for the Advanced Battlespace Management Agency, and Commercial Systems Division's team effort for Insurance Company of North America (INA) in designing a comprehensive computer-assisted operations system.

SDC also has been selected as one of two primary implementation contractors to help develop a master plan for a broad-scale

instead of a serious shortage of programmers, as expected, we have programmers unemployed for the first time.

Many organizations have cut down on the work hours for their installations and have excess machine time for sale.

Why is this a serious economic indicator of its own? Computers are at the pulse of what goes on in this country, in all aspects, and in particular for, new activity.

This is one of the few growth

industries. Yet growth is being snuffed out. This affects all the peripheral computer software firms, memory component companies, and many others.

Instead of being put through the exciting phase of develop-

ment and their financial statement, something never before known in the history of the industry.

Research teams are being broken up. Projects are not being renewed. New research money is impossible to find, not just because of aerospace and space cutbacks, but because of anti-nuclearism/anti-research attitudes by both major parties in Congress and lack of spending by Congress.

Robert Finch, in a recent press conference, said it might be two to six years before the country could once again absorb its technical talents. He added, "The government used to seek out industry, but that government is now a buyers market. In other words, companies have to seek out the government.

But with no guarantees of any

follow-up government spending to write off the research and development costs, return a necessary profit, and make the risk worth the gamble, companies are going to do very little "seeking out."

The American Federation of Information Processing Societies (Afips) represents not only technical people in the computer industry, but through its exhibits, which are the largest in the industry, it has a responsibility to the total industry.

Lobbying is a dirty word to technical people. However, looking at a situation like the intention of Congress and government officials the plight of this critical industry. It is not just "another" industry. It is crucial to every aspect of our country.

computer-based information system to serve the U.S. House of Representatives.

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### Earnings Reports

BRADFORD COMPUTER & SVS.  
Three Months Ended Sept. 30

	\$11	\$105
Revenue	2,203,814	1,326,420
Expenses	318,924	155,440
q3 Mkt Shr	.29	.13
Revenue	6,261,942	2,901,190
Expenses	1,034,200	135,544
e-Sales	on average number of shares outstanding before repurchase of stock	of shares outstanding after repurchase of stock
	for one stock split affected May 15,	1970.



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| <input type="checkbox"/> Management control    | <input type="checkbox"/> Have representative call |

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# Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, NOVEMBER 5, 1970

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TRADE QUOTES, INC.  
Cambridge, Mass. 02138

## Earnings Reports

LMC DATA INC.  
Six Month Ended August 31  
1970 \*1969  
Revenue \$1,757,469 \$1,527,477  
Net Income 154,310 134,310  
a-Net restated to reflect year-end  
equivalent write-offs.

WANG LABORATORIES INC.  
Three Months Ended Sept. 30  
1970 \*1969  
Sht End 5.15 \$48.14  
Revenue 7,748,012 5,466,228  
Net Income 1,000,000 700,000  
a-Adjusted for two-for-one stock  
split in 1970.

PETER INVESTMENT CO.  
Three Months Ended Sept. 30  
1970 \*1969  
Sht End 1.14 \$1.14  
Revenue 6,350,000 7,175,000  
Earnings 390,000 337,000

### APPLIED DATA RESEARCH

Three Months Ended Sept. 30  
1970 \*1969  
Sht End 4.05 \$4.08  
Revenue 1,852,151 1,810,336  
Net Income 1,000,000 1,000,000  
Earnings 1,237,333 753,666  
Mo Shr 5,125,000 4,856,131  
Spec Cred 77,216 .....  
Loss (20,590) 152,891

a-Basis on income before special  
cres and extraordinary items per share  
equivalent of convertible debt issues,  
equivalent to 13 cents a share.

### TELEX CORP.

Three Months Ended Sept. 30  
1970 \*1969  
Sht End 5.27 \$5.11  
Revenue 2,862,000 1,200,000  
Net Income 2,062,000 1,066,000  
Mo Shr .50 b.19  
Earnings 5,199,000 1,37,000

a-On a primary basis, b-Adjusted for  
conversion of one stock split in May  
1970.

Telex earnings assume full dilution  
of 27 cents per share, the amount  
and 50 cents in the six months of 1970,  
and 25 cents and 48 cents in 1969 and 18  
cents, respectively, in 1968.

### DIEBOLD COMPUTER LEASING

Three Months Ended Sept. 30  
1970 \*1969  
Sht End 8.12 \$4.05  
Revenue 8,148,000 7,933,000  
Earnings 485,000 319,000  
Mo Shr .33 .39  
Earnings 24,779,000 22,000,000  
Mo Shr 2,288,000 2,041,000

a-In fully diluted basis, earnings  
per share would be 11 cents in 1970  
quarter, 12 cents in 1969 and 18  
cents and 28 cents, respectively,  
in the nine month period.

### BOOTH COMPUTER CORP.

Three Months Ended Sept. 30  
1970 \*1969  
Sht End 5.42 \$3.33  
Revenue 10,201,000 9,630,000  
Earnings 785,000 634,000  
Mo Shr 1.22 1.10  
Earnings 30,704,000 28,432,000  
Mo Shr 2,288,000 2,041,000

a-Adjusted for 10% stock dividend in  
July 1970.

b-Fully diluted shares were 39  
cents in the quarter and 11.2 cents  
in the nine months ended Sept. 30, 1970,  
compared with 32 cents and 29 cents in 1969.

### UANCO INC.

Year Ended Sept. 30  
1970 \*1969  
Sht End \$2.16 \$2.02  
Revenue 96,598,900 91,300,000  
Net Income 4,154,700 4,154,700  
Mo Shr .46 .70  
Earnings 25,881,000 23,705,000  
Mo Shr 946,800 1,431,100

a-Includes operations of Drummond  
Formes Firms, Inc., since April 1,  
1970.

### BALTIMORE BUSINESS FORMS

Three Months Ended Sept. 30  
1970 \*1969  
Sht End 1.01 \$1.15  
Revenue 4,155,054 4,431,607  
Earnings 14,000 13,981  
Mo Shr .36 .69  
Earnings 12,839,887 13,373,157  
Mo Shr 3,600 5,212,831

a-Company's principal facility largely  
destroyed by fire.

### ESL INC.

Three Months Ended Sept. 30  
1970 \*1969  
Sht End 8.17 \$12  
Revenue 2,652,156 2,205,655  
Net Income 120,000 145,000  
Mo Shr .45 .30  
Earnings 6,229,849 5,312,113  
Mo Shr 1,500 204,400

EXCH	1970 RANGE	CLOSE NOV 5 1970	WEEK NET (1)	WEEK CHGNE	E H	PRICE						
						1970 RANGE	CLOSE NOV 5 1970	WEEK NET (1)	WEEK CHGNE	E H		
<b>SOFTWARE &amp; EDP SERVICES</b>												
D ADVANCED COMP TECH	1 - 8	1 7/8	- 1/8	-11.7	D STANDARD REGISTER	17 - 30	17 1/4	+ 1/2	+ 2.8			
A APPLIED DATA RES.	1 - 26	2 1/2	- 1/8	-16.8	N SAWYER	22 - 30	18 1/4	+ 3/8	+ 8.1			
O ARIES	1 - 15	2 3/8	- 1/8	-10.0	M MARSH MAGNETICS	22 - 30	18 3/4	+ 3/8	+ 8.1			
A AUTOMATIC DATA PROC.	21 - 42	9 1/2	- 1/8	-10.0	O WALLACE BUS FORMS	18 - 41	17 1/2	- 18 1/8	-51.0			
O BRAIN COMPUTER SCIENCE	1 - 8	1 7/8	- 1/8	-3.5	<b>COMPUTER SYSTEMS</b>							
O BRADY APPLIED SYS	1 - 8	1 1/2	+ 1/8	+ 20.0	N SURROUGHS CORP	78 - 173	114 1/4	+ 3/4	+ 0.6			
O COMPUTER AGE INDUS.	1 - 8	1 1/2	- 1/8	-9.0	N COLLING RADIO	9 - 57	16 3/4	- 1/8	-1.1			
O COMPUTER ENVIRON.	1 - 16	2 1/2	- 1/8	-2.0	N COMPUTER CORP	16 - 59	27 1/4	+ 2 3/8	+ 11.5			
O COMPUTER HARDWARE	1 - 70	28 1/2	- 1/8	-10.0	N DATA GENERAL CORP	50 - 124	60 1/4	+ 1/2	+ 0.8			
O COMPUTER NETWORK	1 - 16	2 1/2	- 1/8	-4.6	N DIGITAL EQUIPMENT	3 - 11	6 3/4	+ 1/2	+ 2.1			
O COMPUTER PROPERTY	9 - 15	8	- 1/8	-7.5	N ELECTRONIC ASSOC.	55 - 152	77	+ 3/8	+ 0.4			
N COMPUTER SCIENCES	6 - 35	10 5/8	- 1/8	-1.1	N ELECTRONIC ENGINEER.	23 - 135	292 1/4	+ 5/8	+ 1.9			
N COMPUTER USAGE	1 - 8	1 1/2	- 1/8	-5.1	N IBM	30 - 85	34 1/8	+ 1 1/8	+ 5.1			
N COMPUTER WORKS	1 - 16	2 1/2	- 1/8	-2.0	N NCR	1 - 35	21 1/4	+ 1/2	+ 1.1			
O DATA COMM	1 - 10	2 1/2	- 1/8	-10.0	N OCEANIC	1 - 35	21 1/4	+ 1/2	+ 1.1			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N GENERAL AUTOMATION	9 - 42	11 1/4	+ 1/2	+ 1.7			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N GENERAL ELECTRIC	60 - 82	85 1/8	+ 1/2	+ 1.1			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N HONEYWELL INC.	15 - 152	77	+ 3/8	+ 0.4			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N HONEYWELL INC.	15 - 152	77	+ 3/8	+ 0.4			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N IBM	235 - 387	292 1/4	+ 5/8	+ 1.9			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N NCR	30 - 85	34 1/8	+ 1 1/8	+ 5.1			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N OCEANIC	1 - 35	21 1/4	+ 1/2	+ 1.1			
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O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N GENERAL AUTOMATION	9 - 42	11 1/4	+ 1/2	+ 1.7			
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O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N HONEYWELL INC.	15 - 152	77	+ 3/8	+ 0.4			
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O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N HONEYWELL INC.	15 - 152	77	+ 3/8	+ 0.4			
O DATA PROCESS	1 - 15	2 1/2	- 1/8	-1.5	N							

# Announcing Autoflow's Fifth First.

## First First: 1966

The first software product listed on the General Services Administration (GSA) schedule.

## Second First: 1967

The first software product selected by Industrial Research Magazine as one of the 100-most significant technical products of 1967.

## Third First: 1968

The first software product with over 500 installations.

## Fourth First: 1969

The first software product with over 1000 installations.

## And now the Fifth First: 1970

Autoflow is the first software product to be granted a United States Patent. (Issued October 6, 1970. Patent No.: 3,533,086.)

Autoflow has proven itself in over 1400 installations, in virtually every type of system. Large, small or anywhere in between.

If you couldn't justify Autoflow before...look again. Because while we're getting our "firsts" we were also building in additions to help in debugging and maintenance. Like three new listings for 360 assembly users (EQU, Macro Usage and Modified Tag Summaries). And new features for 360 COBOL users.

An add to help in conversion and maintenance of second generation programs we've just released our 360 system that processes 1400 series Autocoder and SPS and our 7070 and 7080 Autocoder Autoflow Language Processors.

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Applied Data Research, Inc./Route 206 Center/Princeton, New Jersey 08540/Telephone: 609-921-8550

That's in addition to our 14 input languages and 12 output listings. In all, the 1970 Autoflow is three times more comprehensive than the original. And we're constantly working on newer features.

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**THE SOFTWARE BUILDERS**  
CREATORS OF AUTOFLOW, METACOBOL, LIBRARIAN,  
SAM, ROSCOE, IAM, STAR AND PI-SORT.